The Builder.

VOL. XXXIX. No. 1967. SATURDAY, AUGUST 7, 1880.

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Sir John Soane's Museum.

GREAT many people in London whom one might suppose to be especially interested in art and architecture have hardly heard the name of the Soane Museum, and there are a good many among those who are familiar with its name who know nothing else about it. It seems strange that this should be so, but we have had evidence of the fact not infrequently where we should not have expected it. One cause of the comparative neglect of so interesting an institution is probably the fact of its being situated in what is now not a very central quarter, except for lawyers. Another reason, we have very little doubt, why some of those who know of it never visit it, is to be found in the rather complicated arrangement of the days for seeing it. London is provokingly full of places which can be seen on certain days in the week and not on others; and people are often prevented from visiting the National Gallery or the British Musem from not having at hand any note of their closed days, and fearing only to waste the journey thither. But in both these, as well as in other institutions which have closed days, the open and closed days are the same for all the year round, but in the case of the Soane Museum there is the additional complication that the days are different for different months in the year, and that during five out of the twelve months (September to January, inclusive) it is not open at all. It is impossible to be sure of remembering these in-and-out arrangements, and consequently no one feels safe in recommending any one to go to the Museum unless he is able, at the same time, to state the days on which it can be seen, and there is a general impression of some mystery concerned in gaining access to it. We have not infrequently heard it asked why the original owner made such eccentric dispositions as to the time of opening. He, in fact, did not; he left directions that free access should be afforded to the public to see the Museum on at least two days in every week throughout the months of April, May, and June, "and at such other times in the same or in other months as the trustees shall direct." The trustees have accordingly invented the present complicated arrangement, which is very inconvenient to the public, and not in any way called for by the provisions of the Trust, and which they would do wisely to alter. If the same days of the week were adhered to during the months from February to August,—the time when the largest number of people are living in or visiting London,—that would be more easily remembered, and some perfectly needless trouble and uncertainty would be saved.

A few words by way of a reminder as to the nature and extent of the Soane Museum may not be out of place, on account of the comparative want of due attention which it meets with from professional and amateur architectural and art students. The outward aspect of the house on the north side of Lincoln's-inn-fields is simply that of an ordinary London street house, with some Gothic brackets and some caryatide figures fixed on the front. It was the dwelling-house of the eminent architect who made the collection, along with two other, or part of two other houses, which he purchased and threw into this one. In the rather rambling interior thus formed are to be found objects of architectural or archæological interest of the most varied description, showing how wide were the interests, and how active the mind, of the collector. But independently of the curiosities themselves, their arrangement, and the whole treatment of the house, are of interest as showing how much of individuality and picturesque arrangement may be imparted to a house even within comparatively small limits. Everywhere there is the evidence of original taste displayed in a kind of *curiosa felicitas* of arrangement, sometimes eccentric, always effective: nothing seems to be done as we might find it done in any other house. There is a little trickery in the ingenious use of mirrors in various places. Soane seems to have been fond of the effect of reflection, and to have aimed at breaking and destroying the sense of limited size, and giving apparent vistas to the eye by the use of mirrors where they would not naturally be looked for, and where for the moment they furnish not infrequently a complete illusion. As he was equally fond also of leaving unexpected peeps through unexpected corners, it is difficult often to decide at a glance whether we are really looking through an opening into another compartment of the house, or whether we are deceived by a mirror. The most effective use of the mirror is, perhaps, in the frieze of the library, the front room on the ground-floor, where glass is used on two sides over the cornice of the book-cases, which, being kept clean and free from dust, produces precisely the effect of an opening, a kind of clear-story, over the top of the book-case into another apartment. The ceilings of these two rooms are decorated with paintings by that weak and "pretty" painter, Howard, whose female figures have all the same insipid regular and inexpressive countenance. One of the larger compartments is evidently an inspiration,—one might perhaps say a plagiarism,—from Guido's "Aurora." There is a certain instruction conveyed by the comparison of these paintings, as well as of some other things in the house which are *passés* in taste with the taste of the present day. It is certain that no æsthetic person, architect, poet, or artist, would at present endure to have paintings in the style of these of Howard's on his walls or ceilings; in fact, he dare not have them, he would be a marked man. Yet these were considered beautiful and appropriate by a man of exceptional refinement and culture in the early part of the present century. It is equally possible that some of the mural decorative painting by a special school of painters which is so run after now, may appear just as weak to the eyes of spectators fifty years hence as these of Henry Howard's appear to us. Not, of course, that we would for a moment imply that there are no fixed grounds of criticism, no work which appears beautiful equally to its own and to succeeding generations. But it is certain that in almost every generation, at least during the last two centuries, there have been tastes of the time which have been mere fashions, which are obviously so to us who regard them now, yet which were most implicitly believed in by those who commissioned and those who executed them. What will future generations think of our Burne-Jones-ian beauties, with their long necks and protruding chins, and our decorative classically-draped damsels with conventional flower-jars beside them? Perhaps visitors may then wander over rooms decorated in the taste of to-day, and say, "How curious that people should have seen beauty or meaning in these stiff artificial figures!"

The models of restored Greek and Roman buildings in the dining-room, though on a small scale, are interesting as giving a means of immediate comparison of scale and proportion in some of the most important buildings of the great Classic period. Sir John Soane's portrait by Lawrence hangs in this room; and scattered about are various antique fragments, vases, &c., some of them of very exceptional interest. Through the little ante-room in one corner of the dining-room, filled with small antique fragments and casts (for every inch of space seems to have been made available by this enthusiastic collector), we come on a medley of things which seems bewildering at first, though they are all really very carefully arranged and distributed. In a gallery running east and west are numerous casts of antique sculpture and architectural ornament, mingled with bits of original antique work, as much being crowded into the space as it could possibly hold so as to allow any room for visitors at all. Eastwards through this room is reached what is called a corridor, but should rather be called an antechamber, in which are some fine fragments and casts of capitals, including a very interesting piece of an Egyptian capital, showing more relief in the design of the bell than we meet with in the most familiar forms of Egyptian capital. Through this ante-

room is the picture-room, which of all parts of the Museum shows most admirably the hand of the architect,—the man cunning not only to design artistically, but to arrange and contrive practically, and finding, like every true architect, a pleasure in clever contrivance and arrangement for its own sake. The picture-room contains Hogarth's election scenes,—the four pictures of the "Entertainment," "Canvassing," "Polling," and "Chairing the Member," once the property of pleasant David Garrick, and bought, at the sale after his death, by Soane. Among other works in the room are prints and drawings by Piranesi, a large Canaletti, and a considerable number of small paintings of architectural subjects, chiefly Classical ruins, by Clerisseau, whose name is very likely unknown to many of our readers, but who had a decided specialty of talent as a painter of old buildings. Now we have got tired of painting old Classic buildings, and our most painstaking and talented architectural artists are rather taking to finding out the beauty of old barns and red-brick house fronts, which also no doubt have a beauty of their own. Still, there was about the subjects which Clerisseau painted a poetic interest and a faded dignity and grace which we do not find in architecture of the red-brick epoch. Every taste has its reaction, however; only people have a habit now of mistaking the reaction for a new impulse in artistic production. But we are wandering ("re-acting") from Sir John Soane's picture-room, part of the interest of which certainly consists in the room itself, and the way in which it is fitted up. By an arrangement of reversible panels on the walls, more pictures are exhibited in this small room than could be shown in the ordinary way on the walls of a room of more than twice the dimensions. Then the south side of the room, which at first seems to consist of picture-screens similar to the rest, opens entirely, and the visitor looks over a railing down into the little room in the basement filled with Gothic work, and called "The Monk's Room," and across into a large recess backed by a stained-glass window, and in the centre of which stands a statue. It is worth while for those who are concerned in the arrangement of plans for producing effect, to see how much interest and novelty of picturesque effect has been produced by Soane in dealing with rooms of exceedingly small dimensions. The picture-room contains also one of those combination views of all the architect's works which were a favourite device at one time, and of which Cockerell made one in honour of the genius of Wren, the engraving of which is well known.

The little Gothic parlour in the basement, reached by a staircase from the vicinity of the picture-room, would not be of so much interest to Mediævalists of the present day as it might have been to those of fifty years ago; but it is surprising, considering the date at which Soane practised, and his own decidedly Classic tastes, that he should have shown so much interest in Gothic detail as the odds and ends in this little room evince that he had. The rest of the basement is occupied much as the ground-floor gallery over it, with various casts of figures and details, except the centre portion, where is placed the great Egyptian alabaster sarcophagus discovered by Belzoni in 1817, and purchased by Soane in 1824. The British Museum contains no such treasure as this in its Egyptian department; it is a wonderful relic, and enough in itself to give a European fame to the collection which contains it. Belzoni said at the time (in his account, which is copied into Mr. Wild's *catalogue raisonné* of the Museum) that this relic had not its equal in the world, and we know of no Egyptian discovery since which can be said to render Belzoni's opinion out of date. Soane bought it for 2,000*l.*, but it would probably command a sum very far in excess of that if it were offered for sale now. The exceptional character of the sarcophagus consists in its size, the preciousness of the material, from which the sarcophagus has been sunk out from the solid mass, only the lid being separate, and the minute and elaborate figures and hieroglyphic writing with which it is covered within and without, and the beauty of execution (from an Egyptian art point of view) of the large figure drawn on the bottom of the interior. The lid was unfortunately broken; the late curator, Mr. Bonomi, had the pieces arranged in the room over the ground-floor gallery, called in the catalogue "The Student's Room."

Going up to the ground-floor gallery again, and round to the south-west corner of it, we come on the breakfast-room,—a little gem of a room,—on which the former owner had evidently bestowed most affectionate embellishment. The breakfast-room is reached through a small lobby which, like every other corner of the house, is filled with casts and curiosities, and the room itself has been given a domical ceiling, with a little lantern in the apex, with miniature painted glass subjects in its sides. The room contains a collection of casts from antique gems, some splendid illuminated books, and various drawings, engravings, and designs, some of which are shown in turning cabinets or panels carrying objects on both their faces, in the same manner as in the picture-room, and turning on hinges on either side of the window.

Going out into the entrance-lobby and up the principal stairs of the house, we find even on the staircase every corner and window-shelf and recess carries its own object of interest. Here is Flaxman's original model for his immortal group of Michael and Satan, there a model at the life-school of the Academy, by Bailey; in a recess off the stairs a small collection of works relating in one way or another to Shakspeare ("The Shakspeare Recess"); in the corresponding recess on the next flight is a collection including a copy of part of the entablature of the Tivoli circular temple, whence this is called "The Tivoli Recess." These two recesses open anglewise off the winders of the stairs, and look as if, in the original economy of the habitation, they might have been water-closets or housemaids' closets (if the latter institution was known in Soane's time). To give an idea of the variety and multiplicity of interest of the Museum to those who have not been there, we give the list of objects to be found in this one last-named recess only, off the upper flight of stairs:—

A cast of a bas-relief of a "Grecian Feast," modelled by Flaxman during his studies in Italy.
A cast of an alto-relief by Banks, modelled under similar circumstances, "The Grief of Achilles."
An original terra-cotta model by Banks for his "Caractacus before Claudius."
A bas-relief in terra-cotta from the Borghese vase, modelled by Flaxman at Rome.
A model of a Sleeping Child, from Chantrey.
A cast from Flaxman's "Shield of Achilles."
Copies of Flaxman's figures of Cupid and Psyche.
Copy of a piece of the Tivoli entablature (as before mentioned), half the size of the original.
A painted-glass window, a copy of one compartment of the window designed by Reynolds for New College, Oxford.

The element of copying or reproduction is more represented here than in most parts of the Museum, so it must not be taken as typical in that way; but it will be admitted that this is pretty well to find in a corner of the stairs on the way from one room to another. The front drawing-room on the first floor contains Hogarth's celebrated series of the "Rake's Progress," the eight pictures being placed on easels in the middle of the floor; owing to the angle at which they are placed to the light, and their being also covered with glass, the details of some of them are not very easily seen: we should suggest that they might possibly be placed in some more advantageous position, but it must be admitted that the space is limited. The ceiling of this room has been very elaborately treated by Soane; and the room itself contains a medley of things besides the Hogarth pictures: drawings by Rubens, Ostade, Clerisseau, Stothard, Corbould, Panini, &c.; medals, bronzes, Indian furniture, models of statues by Flaxman, and a number of other objects of interest, including casts in gold, silver, and bronze of the medal "struck by the architects of England in honour of Sir John Soane," and the address presented to him therewith, on the 24th of March, 1835. Among the medals in the room are a series of 140 medals struck in France during the Consulate and reign of Napoleon. A pretty feature in this room is the treatment of the piers, which form really the main wall of the front and carry the outer wall of the story above, but in this story, as well as in the ground-floor, form a kind of internal loggia, a false front wall being carried up 2 ft. or 3 ft. in advance of the main wall of the front, and containing the windows. There is thus a passage between the window wall and the main piers, and in the drawing-room these piers have niches on the side facing the windows, and turned away from the room, in which are casts of antique candelabra from the Vatican: it makes a picturesque incident in the room when you walk behind these piers and find the niches and vases unexpectedly in the full light from the windows. The back drawing-room on the same floor contains a few good drawings and designs by Soane himself, especially parts of a design for a new House of Lords, in Classic style, with domes of an outline which Soane seems rather to have affected, somewhat low and squat, but looking very solid and monumental. This room, like the front one, contains a great variety of things, sketches, paintings, china, glass, and illuminated MSS. On the staircase ascending to the top story may be seen some bas-reliefs by Flaxman, and a medallion portrait of himself at the age of twenty-four. But we must stop enumerating, merely mentioning that the larger of the upper rooms contains, among a good many other things, large models of two or three of the Pæstum temples, as well as architectural drawings by Soane and others.

The library in the ground-floor room forms a large assortment of books bearing on architectural study,—mostly standard books, which can be consulted and studied, we believe, by application to the curator. But the library portion of the establishment contains other more out-of-the-way matters than these. A great deal of what is there is, in fact, not known or visible to general visitors. The *catalogue raisonné* which has been made by the present curator gives some hint of what is to be found which does not meet the eye, though only partially, as it is intended chiefly as a handy guide to visitors who do not know the place. Copies of Soane's own catalogue, handsome and large volumes in English and French, are placed on the library-table for consultation. Of this catalogue only about 150 copies were printed by Soane, to send to amateurs and curators of museums in England and abroad. Among the things most prized is a very large collection of original drawings by Robert and James Adam, in no less than fifty-five folio volumes. These comprise chiefly furniture and decorative design, and many of the drawings are finished with a degree of delicacy which, coupled with their great number, gives a notable impression of the great industry of these "Adelphi," though we cannot (so far as we looked over them) agree with the remark in the catalogue, that they are "of great interest to students in decorative art." They have great practical interest, no doubt, in this sense, that decoration in the style of the Adams has lately become the fashion, and that, for designers who want to fill their pockets by following the fashion, here is the very fountain-head to "crib" from; but we should be very sorry to see any student in whom we felt an interest taking to the serious study of these designs as part of his education. They seem to us to illustrate significantly the fact that a man may be most industrious and earnest in his pursuit of his profession, and may be a beautiful and painstaking draughtsman, and yet may have missed true art altogether. There is, to say truth, little variety in these Adam designs: they harp on one string very much, and repeat the same conceits over and over again. Some of the furniture design is very good; some very bad. There seems no guiding principle; and the instances in which colour forms part of the design are too dreadful to think of—they set one's teeth on edge. Imagine a wreath with pink flowers on an arsenical green ground! Still, the value of the collection, as the best illustration possible of a phase in the history of English taste, we do not mean to underrate by any means. Among other collections of drawings is a volume of Thorpe's designs for houses, with very roughly-drawn plans and elevations, in which some parts of the house are shown in geometrical elevation, and other details in perspective or bird's-eye view in order to exhibit them better: these illustrate curiously the *naïveté* of planning and arrangement of houses of the period, as well as some charmingly picturesque combinations and outlines, or what would be such in execution, though they are not shown to advantage in Thorpe's primitive style of drawing. Among other works of the same class are a collection of drawings by Wren, including many for his part of Hampton Court and for Greenwich, some by Inigo Jones, and a volume by Hawksmoor. Wren's are admirable specimens of clear, precise, but not laboured drawing.

It must not not be supposed that in running through the nature of the contents of Sir John Soane's house, we have by any means indicated a tithe of the things to be found in it; we have indicated their nature and variety, but the collection is so large, varied, and curious, that the wonder is that so much could have been got into so small a house, and arranged so as to be all seen. This, however, has been done, chiefly by the ingenuity and sense of order of the col-

lector himself, by whom the bulk of the collection was arranged just as it now stands. We have thought it worth while to give a little space towards recalling it to recollection, since, old as the Museum comparatively is now, it seems to be practically unknown to many who ought to know it. This is partly, perhaps, because the fame of Soane's name has been forgotten by a generation intent upon another style of architecture from that in which he laboured so industriously, and most people who read about or study architecture in the present day know little about Soane except that he was the architect of the Bank of England exterior design, as it at present stands; and many will be found to deny any particular merit now to a building in a style which the fashion of the present day turns away from. But in reality the Bank of England, including the interiors, though no doubt open to criticism, illustrates very pointedly that which comes out more or less in most of the designs by Soane that are extant, that he was an architect who thought for himself, who did not follow a beaten track, but who put his own mind to an architectural problem, and solved it in his own way. And the collection which he left behind in his house, and its admirable arrangement, indicate equally how he must have cared for his profession, how much of his heart and soul must have gone into it. One cannot help feeling, in walking over the houseful of artistic objects and curiosities which he has left, how earnest this man must have been in his work, how wide-awake he must have been, how on the look-out for everything of interest in connexion with his studies, how thoroughly practical as well as cultured: and thus he, being dead, yet speaketh, giving us the old lesson, "Whatsoever thy hand findeth to do, do it with thy might."

BIG BRIDGE CONSTRUCTION.

The rejection, by a Select Committee of the House of Commons, of the Bill for the construction of a slightly modified bridge over the Tay, affords a practical comment on the observations we have heretofore offered on the official inquiry into the causes of the disaster which befel the former structure. That two engineers, one Royal and one Civil, should have consented to carry on such an inquiry in the absence of the drawings of the bridge, and without making any such representation as to the absence of those drawings as might, at all events, have thrown the blame in the right quarter, was to us, at the time, inexplicable. We do not say that the Commissioners were bound to refuse to proceed with the inquiry in the absence of the drawings. But we did expect such an appeal to the Board of Trade in the first instance, and, failing redress, such a statement of the fact of this suppression of evidence in the report itself, as might have put the professional members of the Commission right with their own brethren. As it is, the shareholders have to pay the piper. Considering all that had been said, and all that had not been said, as to the responsibility of Colonel Hutchinson in respect of what was called the examination of the bridge on the part of the Board of Trade before opening the line over it for traffic, we do not see how Colonel Yolland could well have avoided reporting against the approval of a design which appears to have been adopted by the directors of the railway between their first and their second appearance before the committee,—a design as to which the author admitted that "he had still much to verify." There is some confusion in the reports which we have read as to one point in his new design. From the evidence of Mr. Brunlees, it appeared as if brick piers on the existing foundations were proposed; but, on the other hand, it was stated by counsel that the piers were to be for a double width of line, while the bridge was to be, in the first instance, only for a single line. We fully agree with Colonel Yolland in the opinion that a single-line bridge should not be authorised. As to the question of brick or iron piers, it is a matter of design and of calculation, not to be settled off-hand, or without due investigation. Still more important is the third requisition on which the Board of Trade has been advised to insist, namely, that the foundations should be entirely new. When demands of such a nature are made unexpectedly, before a committee, the promoters of a Bill are taken aback. It is possible that the addition of the proposed clauses would have the effect of at once doubling the cost of the bridge. At all events, this would take time to ascertain. Had the original design for the bridge been produced and discussed before the commission of inquiry, this company would have known what to expect. New demands could not have been raised at the eleventh hour; and the delay of a year, involving heavy expense, would have been saved to the company. As it is, however, the directors have only themselves to thank for an opposition which the suppression of the original plans rendered unavoidable, though it is to be regretted that it was not announced until the latest available moment.

The question of entirely new foundations is one of very great importance. Its turning up at this last moment affords a very striking proof of the penny-wisdom, which may prove to be pound-folly, of stinting the proper outlay for an important work. If the traffic which the Tay Bridge was to accommodate was worth the cost of building a bridge at all, even if a single line of way would in the first instance have been sufficient to accommodate the trains of the company, no person of prudence would have sanctioned the preparation of foundations that were insufficient to carry a double way. If the foundations had been put in for a bridge of the ordinary width, and if, above a certain height, the bridge had been in the first instance proceeded with for a single way alone, it is very possible that the overthrow would have been avoided. In any case, the contemplation that the need for a double line would arise at some future time ought never to have been omitted, nor should such a mode of obtaining foundations have been adopted as would have been certain to involve a very grave engineering difficulty whenever the case of widening came to be carried out.

It is well to give full attention to this part of the case, because it points to something nearer home than Dundee. In the various plans which have from time to time been ventilated as to the widening of London Bridge, the advocates appear to have closed their eyes to the nature of the foundations obtained by Rennie. This great engineer was compelled by the City authorities to build the noble monument in question in a spot which he considered not the fittest for the purpose. The true site of the bridge was abandoned for the sake of saving the expense of a temporary bridge. As far as the means at the command of the science of his day went, Rennie made the best of his design. But it was touch and go. In fact, it was "go" for some 14 in., and though the movement of the abutment was arrested, and the bridge has ever since been stable, there can be no certitude as to the anticipation how soon the steady action of the river in deepening its bed may set the bridge again on the move, and we think that there is very little room to doubt that any tinkering of the superstructure would very rapidly have that effect.

All builders know how ticklish a thing it is to build a new wall as a continuation of an old one, into which it is to be bonded. And if this be the case in the open air, on the side of a house, or on any line of plain surface, how is the difficulty increased if the junction has to be effected 30 ft. under water, in an estuary or tidal river? This task, which we think it would probably prove impossible to accomplish on London Bridge without some mishap, is not an easy one to effect in the river Tay. But the putting in of brick foundations for a double line would require such a junction of new and of old work. We think that it may be very seriously questioned whether it would not prove safer, and ultimately cheaper, to build a new bridge *in toto*, and to remove all the piers of the old bridge, than to undertake the task of widening the piers of the latter. At all events, we hold it tolerably certain that there are no grounds for any confident expectation to the contrary. It might be possible to coffer-dam round the existing piers, to excavate and lay wider foundations, and to carry up the whole as a sound piece of workmanship; but with evidence before the committee that it may be necessary to protect the bottom of the river from scour "by means of stone,"—in fact, to pave or pitch the bottom of the Tay, we feel sure that the very best and most deliberate advice ought to be secured before making any such attempt.

The actual position of the Tay Bridge is such as to point to the need of an exhaustive inquiry into the theory of bridges of large span. At the present time the width of the span into which a bridge may be divided,—and we may say the same with regard to the roof of a station, or of any great area,—depends pretty much upon the taste of the engineer. The question of level, in the case, at all events, of the bridge, is here one of primary importance. A balance has to be struck between the cost of pier and that of arch; between the cost of numerous piers, and that of arches or girders over wide spans. No definite relation can be laid down as normal between the two estimates of cost, because the cost of the piers differs to an extraordinary extent in different cases. Thus a span which it might be altogether extravagant to use in the case of a wide flat valley, might prove to be economical in the case of a deep ravine. If any approach to a general formula of proportion is to be obtained, it must include an expression for the height of the piers, and another expression for the anticipated costliness, in the matter of obtaining foundations.

It is instructive, as giving some measure of the progress made by the engineer during the past sixty years, to compare the dimensions of Old London Bridge, according to the survey of it made by Mr. Giles, in 1820, by order of the Committee of the Bridge Lands, with some of the latest erections of large spans, both in this country and the United States. The width of the river between the abutments of London Bridge, according to the survey quoted, was 931 ft. Of this width no less than 406 ft. 10 in., or above 42 per cent., was occupied by the piers. But a further obstacle to the flow of the river was offered by the starlings, or pile-work protections, to prevent the piers from being undercut by the current, which amounted to 293 ft. 5 in. This reduced the water-way, at low water, to 230 ft. 11 in., or rather less than one-fourth of the normal width of the river. The consequence of this contraction was to produce a row of waterfalls through the arches of the bridge, in which the river fell 2 ft. 1 in. at neap tides, and 4 ft. 4 in. at springs; an extreme fall of 5 ft. 7 in. having been noted during the occurrence of a highland flood, falling on a spring-tide ebb.

In contrast to this cumbrous and clumsy structure, we may cite the elaborate calculations brought by Professor Clericetti, of Milan, before the Institution of Civil Engineers, and published in vol. lx. of the Minutes of Proceedings of that Institution. The result, in two lines, is, that a girder can be constructed which would bear its own weight for a span of 900 mètres, and that by the addition of inclined steel cables, fixed to towers rising 90 mètres above the girders, a span of 1,500 mètres might be obtained. The pull upon the cable, in this case, is taken at 20 kilogrammes for each square millimètre of cross section, or rather more than 13 tons per square inch. M. Max am Ende calculates the limiting span of a straight girder, with struts and diagonal ties, with 5 tons strain on the square inch, at 2,870 ft.; that for a straight girder, with diagonal struts and diagonal ties, at 4,000 ft. for iron, and 6,000 ft. for steel, with a strain of 7½ tons per inch. For a parabolic bowstring girder, the limiting span is given as 3,000 ft., the corresponding depth of the girder being 1,830 ft. For the parabolic fish girder, this gentleman proposes a limiting span of 4,200 ft., with a depth of 3,600 ft., in iron, and a span of 6,300 ft., with a depth of 5,400 ft., in steel. These are purely theoretical figures, and take into account simply the force of gravity.

As to most of this, however, the practical builder will be content to allow it to remain in the cloudy limbo of algebraical theory. What is more to the point is to inquire of what spans bridges have been actually constructed. We can obtain some valuable information on this subject from a paper by Thomas Curtis Clarke, M. Inst. C.E., which was read before the Institution of Civil Engineers on the 21st of May, 1878. But it is very remarkable, as illustrating how far we yet are from arriving at any normal rules, such as we before indicated as desirable, for the proportion between width of span and number of piers, that in the 21 columns in which Mr. Clarke tabulates the information of which we are about to cite a portion, no mention is made of the height of the platform of the bridge above the water which it crosses.

The width of span, then, which has been obtained in the case of sixteen important tubular

and girder bridges, constructed of iron, up to the year 1877, are as follows:—

Where built.	Span.	Engineer.
1. Susquehanna River, U.S.	307	Phœnix Bridge Co.
2. Ohio River, U.S.	319	J. H. Linville
3. St. Lawrence River, Canada	330	Robt. Stephenson
4. Ohio (Parkersberg), U.S.	342	J. H. Linvile
5. Rhine, Mayence	345	Gerber
6. Ohio (Louisville), U.S.	368	Albert Fink
7. Kentucky River, U.S.	375	C. S. Smith
8. Ohio (Louisville), U.S.	396	Albert Fink
9. Vistula (Dirschau)	397	Lentze
10. Conway, N. Wales	400	Robt. Stephenson
11. Ohio (Cincinnati), U.S.	415	J. H. Linville
12. Inn (Passau)	420	
13. Saltash	455	I. K. Brunel
14. Menai Straits	460	Robt. Stephenson
15. Lek, Holland	492	G. Van Diesen
16. Ohio (Cincinnati), U.S.	518	J. H. Linville

The figures merely indicate the width in feet of the longest span in each of the bridges cited. To these works should be added the suspension railway bridge over the Niagara river, immediately above the Falls, which was opened for traffic in March, 1855. The span of this bridge is 822 ft. 6 in. The height of the platform, which carries three lines of rails, of the respective gauges of 3 ft. 6 in., 4 ft. 8½ in., and 5 ft. 6 in., above the river, is 250 ft. Below the railway platform is suspended a second platform, for common road vehicles. The bridge is supported by four wire cables, of 10 in. diameter, each containing 3,640 wires of No. 9, B. W. G. The weight of the superstructure is 750 tons. The supporting strength of the cables is estimated at 7,000 tons. The bridge was designed and constructed by the late Mr. J. A. Roebling, the engineer in chief, who was also a manufacturer of wire ropes. The cost was about 500,000 dollars, or a little over 152*l.* per foot of span.

Of the bridges in the table, those built by Mr. Stephenson over the Conway, in 1848, the Menai Straits, in 1850, and the St. Lawrence, in 1859, are all tubular girders, through which the trains run. The bridges numbered 2, 6, 8, have the top chords cast, the rest of the girders being of rolled iron. The girders are quandrangular, with pin connexions. Numbers 1, 4, 7, 9, 12, 15, and 16, are all made of rolled iron. The Saltash Bridge, built by Mr. Brunel in 1859, crosses the river Tamar, about three miles north of Plymouth, at a place where the river narrows to about 1,100 ft. wide, and has a depth of 70 ft. It was at first proposed that this bridge should consist of seven openings, one of 250 ft. and six of 100 ft. each. But the Admiralty insisted that there should be only four spans, two of 300, and two of 200 ft. each, with straight soffits, and a clear headway of 100 ft. above high water. After a very careful and minute investigation of the bed of the river, made by 175 borings, carried on by aid of a wrought-iron cylinder 6 ft. diameter, and 85 ft. long, which was slung between two gun-brigs, and pitched at thirty-five different places on the river, Mr. Brunel decided upon adopting two main spans of 455 ft. each, supported on a masonry pier. For the construction of this pier a wrought-iron cylinder, 37 ft. in diameter and 90 ft. in length, was sunk through the mud at the bottom of the river to the solid rock. The total length of the bridge, including the adjoining land-openings, is 2,280 ft. It consists, besides the two main spans, of two openings of 93 ft., two of 83 ft. 6 in., two 78 ft., two of 72 ft. 6 in., and nine of 69 ft. 6 in. each. The central column, of solid masonry, 35 ft. in diameter, is 96 ft. in height from the rock foundation to above high-water mark. Upon this are placed four octagonal columns of cast-iron, 10 ft. in diameter, carried up to the level of the roadway, which is 100 ft. above high-water mark. Holding-down lewis bolts were let into the solid rock on which this pier was built, with iron bars built into the masonry. A description of the centre pier of this noble bridge, by Mr. R. P. Brereton, M. Inst. C.E., will be found in vol. xxi. of the Minutes of Proceedings of the Institution of Civil Engineers.

In the course of the discussion on Mr. Clarke's paper, from which we have cited the spans of sixteen large bridges, Mr. Barlow compared the efficiency and structural merit of the several designs, according to a method proposed by Professor Rankine, which consists in ascertaining the limiting spans attainable on each system. The bridges in question may be arranged in four classes, viz.,—(1), quadrangular girders, with pin-connexions; (2), the Saltash Bridge, which Mr. Clarke calls a lenticular girder; (3), lattice bridges; and (4), tubular bridges. Of these, the six examples of the first kind have an average limiting span of 900 ft., the several cases ranging from 852 ft. to 982 ft. Mr. Brunel's bridge, though of comparatively an early date, has a limiting span of rather more than 900 ft. In the lattice bridges, the waste of metal amounts to from 40 to 46 per cent., as compared with the former structures. In the tubular bridges it is still more; but it must be remembered that these were the first efforts to introduce iron in large spans in railway bridges.

In looking at the large amount of valuable information that may be gleaned from many of the sixty volumes of the Minutes of the Proceedings of the Institution of Civil Engineers, we are struck with the absence of any attempt to show such a comparative view of the cost of these great structures as would be of service in framing general rules for the guidance of the bridge-builder. The remarks which we have just quoted go in the right direction, but they only go a little way in that direction. Mr. Douglas Fox, in the discussion on Mr. Clarke's paper, gave the counsel to avoid large spans altogether if possible, because, if a pier could be introduced, even though the cost were the same, it would be a great advantage. We are disposed to agree with the recommendation. But what we want is, not to have it offered as an opinion; but to have the facts so clearly brought out as to allow them to speak for themselves. "The larger the span, the greater the risk in erection, and the greater the cost in maintenance." That, moreover may be true, but again we wish for proof. Again, the fact that certain elements of strength are required to increase, not as the span, but as the square of the span, is one that needs being brought fully out,—so as to show in what manner, other things being equal, the cost of one opening of 200 ft. span compares with that of two openings of 100 ft. span each,—taking the girders alone; so that allowance may be made for the piers according to the height of the structure. We find no attempt to bring this before the professional world, and we feel very sure that architects, engineers, and builders will have reason for gratitude to the writer who shall put into available form the large mass of experience which has been attained on this subject.

Mr. Clarke, in his reply, made some observations which show that American engineers have given due attention to a subject on which it must be admitted that English engineers have not of late exhibited the most profound knowledge. "A bridge," said this gentleman (whose address is given as in New York), "is a complex structure. It has to bear not only the force of gravity, but the side pressure of the wind. It had been said that it was a simple matter to provide against the force of wind, but that was really the most difficult and complicated part of the problem. The most economical height possible had to be used to resist the force of gravity; but then the side-pressure prevented the use of an economical height; consequently the bridge, when it was finished, was a compromise between the results of two forces. That was why the long-span bridges were comparatively not so high as those of shorter span. In spans of less than 200 ft. the proportion of height to span was 1-5th or 1-6th." When we find that this outcome of American practice was brought before the Institution of Civil Engineers in May, 1878, Mr. W. H. Barlow being in the chair, we cannot avoid referring to the opinion we felt bound to express (*ante*, p. 39) with regard to the report of Messrs. Hawkshaw, Bidder, Harrison, and Barlow, as to the adoption of 10 lb. as side-pressure on the Forth and Tay Bridges. In this country, when the first bridges of wide span were designed by Mr. Stephenson and Mr. Brunel, the question of wind-pressure, although duly considered by those experienced engineers, had not assumed the importance which attached to it in the opinion of the designers of the bridges on the American pattern. We have on record references to investigations as to the force of the wind on the Menai Bridge, as well as to the wind action on the suspension bridge of Telford over the same Straits. But with regard to the tubular girders we might almost as well have inquired whether a storm of wind could blow down the walls of Conway Castle, as whether it could shift or overthrow the great tubes. And in the case of the Saltash Bridge, where the resistance offered to the side pressure of the wind was comparatively so small, we have seen what were the ponderous dimensions of the central pier. These were the works of the fathers of our railway system; and whatever may be said of the advance of science since, it is certain that Stephenson and Brunel did not build works which it was unsafe to cross in a storm, were it the fiercest that ever blew in our island. What we feel to be so lamentable,—we might use a stronger word,—is the comparison of the evidence and arguments offered as to the Tay Bridge with the practice of our two great engineers on the one hand, and with the study, as well as the practice, of the engineers of the United States on the other. In the discussion to which we have referred, one engineer, Mr. E. W. Young, said that "in every bridge designed by him 40 lb. wind pressure per square foot had been allowed, and security obtained." "The difficulty in designing girders of very long span is to get width enough to resist wind-pressure," observes Mr. Clarke. It would be well if every student who reads the reports made to the Board of Trade by Mr. Barlow and Colonel Yolland, as well as that of Mr. Rothery, were also to read with attention the debate from which we have made extracts. It will strike them, we think, that the degree of knowledge of wind-pressure that has been brought to bear on the subject of the Tay Bridge by all those who have given advice or evidence on the subject is very far below that which is common to the engineers of America, of Germany, and of France.

EXHIBITION OF METAL WORK IN PARIS.

It is but a few weeks since that the annual *Salon*, with its 7,000 exhibits, closed its doors, and now we have to announce the opening at the Palais de l'Industrie, on Saturday, July 31st, of the sixth biennial Exhibition of the "Central Union of the Fine Arts applied to Industry." The first of a special series of exhibitions, each devoted to some important branch of the industrial arts, this year's exhibition shows very properly the ancient art and industry of the metal-worker.

Incomplete as naturally the show might be expected to be at this early stage, it is not difficult to judge of its character. Amidst the confusion, the hammering, and the general arrangement of tardy exhibits, an order is observable, and by the excellent management of the president, M. Henri Bouilhet, we shall in a few days see "cosmos" issue from all this apparent "chaos." When all is arranged (particularly the museum, not opened on Saturday) those interested will have it in their power, between this and the middle of November, to examine with care the interesting collection of objects which have been gathered together under the hospitable roof of the Palais de l'Industrie, which, since the Great Exhibition of 1855, has opened wide its doors and afforded shelter and ample space for so many artistic and industrial wonders, not alone of France, but of the world.

The promise is sufficiently extensive in the show that is made by the various trades connected with the great metal industry; the retrospective museum, with its specimens of the work of the past; the working drawings and industrial compositions,—among these a number by Viollet-le-Duc; a series of models and decorative paintings by contemporary artists, completed by the various competitions that will be held during the exhibition, add to this the various other attractions of a more popular nature which are never wanting in a French "Exposition," and it will be seen, we think, that the Union Centrale have skilfully prepared their campaign for 1880.

Those who remember the modest commencement of this society, and its comfortable but narrow quarters in the old Palais Royale (the Place des Vosges of to-day), and who may even then have derived instruction from its well-selected library, may congratulate the promoters of this society on the enormous progress they have made in carrying out their original aims.*

A demur is often expressed in England, not only as to the desirability of these great shows, but with the general public, and even with the various professions, such exhibitions are voted troublesome and "boring"; but whether it is that the French people can stand a great deal

* What this progress has been (particularly in connexion with the tapestry exhibition of 1876, the last held, and to which reference was made in these columns) the President and Vice-president showed in the two speeches made at the close of the exhibition, and reprinted as an introduction to the present catalogue.

more "boring" than others (as they seem to show by the patience with which they can sit out lengthy performances, or twenty-five minute *entr'actes*), or that they are sound in their appreciation of exhibitions, it is certainly the case that rarely in Paris does one hear any person complain of being "bored" at the Palais de l'Industrie.

This great difficulty overcome, ample opportunity is afforded for the consideration of the means to attain the chief aim of the exhibition, whether it be artistic, industrial, or scientific. The importance of this question may be judged when it is remembered how, through a misconception of the requirements of the public, the excellent and interesting series of technical exhibitions which were to be annually held at South Kensington miserably collapsed. In Paris the success of each succeeding exhibition is proved to be greater than the last, a fact encouraging to those who have expressed it as their opinion that exhibitions have now entered entirely into the needs and habits of modern existence.

Certainly, one of the most valid arguments that can be brought against some of the exhibitions recently held is their too general character, in which, by their very vastness, any special aim has been overlooked. This having been admitted, we cannot too warmly thank those who, resisting the fascinations of pecuniary success and popularity, have determined that the exhibition under their management shall prove of a character purely instructive in its highest sense. In reality both the public and the professional world are gainers by this arrangement.

It is, of course, difficult to tell the direction that the industrial arts might have taken unaffected by the impetus given to them by the Great Exhibition of 1851. Art in its application to industry was rapidly passing even beyond the influence of tradition, and normal as may have been the cause which led to the revival, we may at length feel that we are progressing on the road to a more general spread of refined taste, which, let it be remembered, was not so universal in the past as many either believe or would make us believe. The foundation of the numerous museums and schools which have followed on the art revival of the middle of the century,—never can sufficient credit be given to the great promoter of the movement, Prince Albert,—the artistic agitation in favour of a return to traditional art, fostered by equally earnest literary support; the foundation of societies and journals, have all influenced powerfully within twenty years the relations of art and industry to each other. In all civilised countries the same movement is to be traced; in England and America efforts made in this direction are leading to results which are to the utmost degree satisfactory when the short time is taken into consideration during which the new teaching has been practised. In France, the decadence into which the industrial arts had fallen a generation or so since aroused, as it had in England, the energy of the more thoughtful and observant; it was felt that some effort must be made to arrest the industrial arts, too evidently on their downward slope. Much was said and written at the time by professors and professional critics, and eventually a society was formed,—the aims of which we have already discussed in these pages,—the title of which suffices to show the direction in which the members desired to act upon the public, the "Central Union of the Fine Arts applied to Industry."

The consideration of the fine arts in their application to industrial purposes was a subject of no small importance; the society have not shrunk from their task, and have steadily been carrying out the intention of their originators. The present exhibition forms a portion of the plan, but it is not alone on this means that the society relies. In addition to its excellent working library,* it affords a series of lectures treating always of art in its application to industrial purposes; and competitions open to students of Paris and the provinces. The object of the society is in every way to further in the mind of the designer and the workman a sense of the importance of the beautiful in connexion with the useful,—an aim which is so rarely attained in this essentially utilitarian age.

* From a recently-published monthly report we learn that during March and April of this year respectively some 385 and 567 artists and artisans, sculptors, painters, designers, engravers, chisellers, decorators, architects, jewellers, cabinet-makers, lithographers, and others, worked in the library of the Society. In March 520 works, in April 635, were consulted. This, for a private institution, is a satisfactory piece of statistics.

If there is a want of the beauty which the artists of the past so universally placed in their simplest work, may not a reason be sought in the absence of our respect for the traditions of those older masters of ours, who themselves in every work they produced showed so religious a worship of their predecessors? Without we avail ourselves of the great lessons of the past, how can we hope to do more than did Robinson Crusoe on his island, puzzle out with infinite difficulty the objects which he needed for daily life, and to the construction of which he had never before devoted a moment's thought? Availing ourselves of the lessons of the past, we may leave valuable instruction for the future.

As an important factor in the education of the designer and the workman, this knowledge of what his predecessors have done cannot be too constantly brought forward; and the "retrospective" museums which the French so successfully prepare, and which form a marked feature in the educational scheme of the Union Centrale, form an admirable school for the young artist and the young artisan, who have by our modern system,—in which the hard and useful apprenticeship of the past is abolished,—so much to learn. Nothing more curiously showed the deficiency of even the most ordinary technical education than the recent competition for a design in metal, held by the Union Centrale, and of which we had intended to speak before now. In the designs, skilful as they were, it was easy to detect the absolute insufficiency of the knowledge indispensable to every artist, an ignorance of the most simple elements of architecture. It seems, wrote a French journal at the time, as if our designers had a profound contempt for serious and methodical study. "This," continues the same critic, "must be remedied, for it is by the order and severe nature of their system of study that the progress of our rivals has become visible, if not formidable,—a fact which would permit one to consider that we should end by allowing ourselves to be beaten if we did not add to our natural qualities those of the respectable artificer, by the aid of which neighbours, far less gifted than ourselves, have already made rapid advances."

Let us respect, therefore, the lessons of the past,—a piece of advice which at first sight might appear somewhat needless, were it not for many who, in their search for originality, would wish to ignore the bygone days. Such workers can never hope to attain their object; their originality will alone manifest itself as they find their minds better stored with the knowledge of what has been done before them.

Those who may take the gloomy view of the uselessness of any attempt to rouse the artistic sentiment in our nineteenth-century souls, who somewhat despairingly speak of "the whole current of human life setting resolutely in a direction opposed to artistic production," and who complain that we now possess "no love of beauty, no sense of the outward dignity of things, and, as a corollary, no dignity, no comeliness for the most part in their outward respect";* those, we repeat, who take this gloomy view of our nineteenth-century existence may be right, for an acquaintance with the history of the development of the human race shows us that its progress has not been uninterruptedly continuous; in the past the search after the beautiful and the useful has not been invariably pursued with complete success. In citing, therefore, the past as our teacher for the present and the future, a wise discretion must be exercised in the choice of the production of a period worthy the attention of the student; and it is the duty of the learned in the history of bygone days, to direct those under their control to the two most important points in all education,—what to emulate and what to avoid; from what encouragement is likely to be received; from what warning lessons are to be obtained.

Richmond.—Mr. John Barran, M.P., recently laid the memorial-stone of a new Baptist Chapel in Duke-street. The freehold site has cost 1,500*l.*, which includes a valuable building now on a portion of the ground. The new chapel will be octagonal, faced with stone, and carried out in the Early Gothic style. It will seat eventually between 700 and 800 persons. There will be school-accommodation and class-rooms. The estimated cost of the proposed building is 3,500*l.*

* Sir Frederick Leighton.

A CAXTON MEMORIAL.

The recent Printers' Exhibition at the Agricultural Hall, Islington, following the Caxton celebration held at South Kensington three years ago, has given to all those who were able to be present pretty good evidence of the progress made in the mystery of the art of printing during the past four hundred years.

At the present time there are very few persons indeed who have given their attention to any extent in the reading of current literature, who have not heard of William Caxton, the first English printer; but, at the same time, we venture to believe that there are a great many individuals who, while knowing the name of the Westminster printer, are nevertheless totally ignorant of the history of the times in which he lived, and, what is more, know nothing of the hardships he had to encounter in his professional capacity,—of his remarkable perseverance and industry, which, by a very small beginning, has produced that great power, the printing-press, to which, and to those who have laboured at it, from William Caxton's time to our own, the readers of this journal, and of every other printed sheet of paper, are so greatly indebted.

The late Mr. Charles Knight, a very worthy disciple of Caxton, very truly remarked, some forty years ago, "The object of the general diffusion of knowledge is not to render men discontented with their lot,—to make the peasant yearn to become an artisan, or the artisan dream of the honours and riches of a profession,—but to give the means of content to those who, for the most part, must necessarily remain in that station which requires great self-denial and great endurance, but which is capable of becoming not only a condition of comfort, but of enjoyment, through the exercise of these very virtues, in connexion with a desire for that improvement of the understanding which, to a large extent, is independent of rank and riches." Next, therefore, to the sustentation of the body, must naturally come the improvement of the mind,—and in working to this end, Caxton and his descendants have earned,—nobly earned,—the lasting gratitude of mankind at large.

It is not our intention to detail the life of Caxton, but only to give a few facts in connexion with his career, as a preface to our present article, which we have thought best to entitle a Caxton Memorial. The subject-matter is derived from the very interesting churchwardens' books of St. Margaret's parish, Westminster,—in which parish Caxton worked at his press and died,—and which books contain a remarkable account, in their various entries, of the remarkable times in which our printer lived. For these extracts we are indebted to Mr. T. C. Noble, who, through the great kindness and courtesy of the rector, the Rev. Canon Farrar, and the churchwardens, Messrs. Helder & Hockridge, has been permitted to have free access to and to carefully examine these very interesting records.

It was about the year 1422, and in the Weald of Kent, that William Caxton is supposed to have been born, and in 1437-8 an entry in the books of the Mercers' Company of the City of London informs us he and John Large paid four shillings as a fee upon being bound apprentices to Robert Large, who was an alderman of the City, and resided in the Old Jewry. But at the end of three years Alderman Large died, and the young 'prentice lad was "turned over" to a new master. We next hear of him at Bruges, engaged in the wool-trade, in which the mercers dealt largely, and in 1462 he is named as "Governor of the English Nation abroad," and copies of several letters to him, in that capacity,—one dated as late as June 3, 1467,—are still preserved in the Mercers' books.

In 1468 was solemnised the marriage of the Princess Margaret of York, sister of Edward IV., and Charles, Duke of Burgundy, and it was then, probably, that William Caxton first came under the notice of the duke, to whom, with two other mercers, he was a trade ambassador in 1469. It was in this year, too, we first find him appearing in print as a literary man, commencing, as he tells us, a translation of Lefevre's "Recuyell of the Histories of Troye," which, under the patronage of, and as a servant to the Duchess of Burgundy, he completed in September, 1471. It would appear he made several MS. copies of this work, which, pleasing the nobility, brought him so many orders that he began to think what was the best way of supplying the demand. It was a very simple circumstance, it is true, but to it the world

at large is indebted for the introduction of the art of printing into England, and the work was the first book printed in the English language. The Duke of Devonshire's copy, with the autograph of Elizabeth Grey, the Queen of Edward IV., was purchased at the celebrated Roxburghe sale, in 1812, for one thousand guineas, and this book, it may be remembered, was exhibited in a glass case on a velvet cushion at the Caxton celebration. It was probably printed at Bruges in 1474, and in it Caxton explains its history in these words:—"And for as moche as in the wrytyng of the same my Penne is worn, myn hande wery & not stedfast myn eyen dimed with overmoche lokyng on the whit paper, and my corage not so prone and redy to laboure as hit hath been, and that age crepeth on me dayly and feebleth all the bodye, and also be cause I have promysid to dyuerce gentil men and to my frendes to addresse to hem as hastely as I myght this sayd book, Therfor I have practysed & lerned at my grete charge and dispense to ordeyne this said book in Prynte after the maner & forme as ye may here see and is not wreton with penne and ynke as other bokes ben."

It was in 1475 or 1476 that William Caxton (and Colard Mansion, who assisted him in these early prints) issued a translation of Cessolis's "Game and Playe of the Chesse," and the same year, or early in 1477, he must have left Bruges for England. It was a momentous time for this country, and readers of this journal will readily understand why, when they are told that within a few months after, the first book printed in England with a date was issued from the precincts of the Abbey of Westminster.

Mr. Blades, in his interesting and very valuable "Life of Caxton," tells us that "his arrangements for settling in England, the engagement of assistants, with all the other matters inseparable from a novel undertaking, must have occupied a considerable portion of time. If, therefore, we assume that about the latter end of 1476 Caxton commenced his new career in this country, we cannot be far wrong." One thing, however, is certain, and that is, we find the imprint to "The Dictes and Notable Wise Sayings of the Philosophers,"—"Emprynted by me, Wylliam Caxton, at Westmestre, 1477," and this would appear to have been issued, or, as he tells us in the book itself,—"fynisshed the xviij. day of the moneth of Novembre,"—thus clearly establishing a precise date for the commencement of printing in England.

From 1477 to the year 1485 we have numerous works from his press, and it is noticeable how curiously his colophons vary. Thus, in the "Chronicles of England," issued just 400 years ago,—in 1480,—we first read of the press as "In thabbey of Westmynstre by London"; in 1483 as "at Westmestre," as well as "in thabbey of Westmynstre"; in 1484 "in Westmynstre besyde London"; and in 1485 "in thabbey Westmestre,"—all leading us to suppose he was carrying on two printing-offices. Then, again, we have a handbill, which Earl Spencer has a copy of, 5 in. by 7 in. in size, desiring his customers to come "to Westmonester in to the Almonesrye at the reed pale," which was probably issued about 1478 or 1480, all which addresses, Mr. Blades concludes, meant but one place; that "thabbey" was really the precincts; that in the precincts was the Almonry, where alms were given to the poor, and Lady Margaret, the mother of Henry VII., erected almshouses; that this Almonry existed, not on the site of Henry VII.'s Chapel, as has been so often asserted, but was "west southwest of the Abbey towers"; and, finally, that the old house, which has been so often pictured as the building where Caxton did his printing, and from the timber of which, when it was pulled down in 1846, were made countless walking-sticks and snuff-boxes, was in reality a house erected long after Caxton's time,—so recent as the reign of Charles II.!

Therefore at the sign of the Red Pale,—and this was not a red pole or a red paling, as often asserted, but a shield in heraldry so called,—Caxton worked, lived, and died. During the years 1477-1490 he was a notable man in his parish, as may readily be supposed. He attended the audit of the churchwardens' accounts, we know (by those existing having his name inserted by the scribe), in 1480, 1482, and 1484. He was a member of the Guild of our Blessed Lady Assumption, held in the church; and in 1491, close upon seventy years of age, he passed away in the very midst of the work he loved so well, for Wynken de Worde's colophon to the "Vitas Patrum" tells us it was "translated oute of Frenche into Englissho by William Caxton, of Westmynstre, late deed, and fynysshed at the laste day of hys lyff." This was bringing matters to a pretty close ending even at that early date; and although we do not know the exact time of his death, yet, fortunately for us, there are the accounts containing his burial still in existence, very religiously preserved, as may be supposed, in the parish in which he died,—St. Margaret's, Westminster. Towards the end of the churchwardens' account for the years 1490-1492, some time towards the close of the year 1491, we find the entry of his funeral, costing 6s. 8d. for the four torches used on the occasion, and 6d. for ringing the knell from the bell in the church tower, payments which seem not very excessive for burying a great man, but, according to the other entries, very much higher than the majority of funerals then cost.

Again, we have it printed in "Scala Perfectionis," in 1493, that the book was finished "in William Caxston's hous," while in Lyndewode's "Constitutiones," in 1496, we find the source of its printing to have been "Apud Westmonasterium in domo Caxston," thus showing that the good work still continued at the old press. Of this William Lyndewode, it may be remembered, some curious particulars were given by the Society of Antiquaries in 1852, when his body was discovered in St. Stephen's Chapel that year ("Archæologia," vol. xxxiv. pp. 406-430). He was formerly rector of All Saints, Bread-street, in the City of London, and died bishop of St. David's, in 1446, and at the opening of his coffin in 1852, the late George Cruikshank made an etching of his head, which is very rare, if not unique, and which is now in the collection of Mr. Noble.

Although we should have supposed that William Caxton made a will, yet after a lengthy search no trace of one could be found by Mr. Blades. He surmises that our printer had nothing to leave beyond his stock-in-trade; and if this surmise is correct, then the possibility occurs of his having arranged before his death who should succeed to his estate. There are entries in the churchwardens' accounts of the "bequest of William Caxton" of a number of his "Golden Legend,"—probably the second edition of the book which was printed; and we find the parish was paid for sixteen copies between the years 1496 and 1504. Unfortunately, the accounts for 1492-1494,—the two years following Caxton's death,—are missing; but in the receipts for 1494-1496, nothing is mentioned. In the first year's account for 1496-8 we find three copies sold for 6s. 8d. each, "of thee printed boks that were bequothen to the church behove by William Caxston"; in 1498-1500 there were disposed of ten copies, viz., one each at 5s., 5s. 6d., 5s. 10d., and 5s. 11d., four at 5s. 8d., and two for 10s. 4d.; in 1500-2, two copies realised 5s. each; and the last copy, which was sold in the first year of 1502-4 brought in 5s. 8d.,—sum total of the sixteen copies, 4l. 10s. 11d. Of course, the value of money four centuries ago was very different to what it is now: the entries which we shall quote hereafter will prove that; but as an illustration of the value of the "Golden Legend" in our day, we may remark that in 1812 the Duke of Roxburghe's copy sold for 31l., and J. D. Gardner's copy in 1854 brought in 230l., and became the property of the Duke d'Aumale; and that no perfect copy of the book is known.

Of those gentlemen to whom the churchwardens sold their copies, William Ryoll purchased two, "the parisshe prest" one. Single copies were sold to four others,—one to "Elys bokebynder," seven to William Geisse or Geyse, and one (in the first year 1498—1500) was "solde in Westmynster Halle" for 5s. 8d., establishing, as we presume, the fact of there having been booksellers in the hall at this early period; while at the same time in that year there is actually an entry, "Rewarded to John Roff for the selling of a legende" one penny,—not a ruinous commission, one will certainly exclaim.

In 1820 the Roxburghe Club desired to raise a monument to Caxton in Westminster Abbey, and the reader will suppose that was a very easy matter. Nothing of the kind. It was as difficult sixty years ago to get a monument into that sanctuary for the record of the deeds of a *great* man as it has been *sixty* years later to keep one *out* of it,—the only difference being, one was to the memory to a simple printer, yet to whom the world is so greatly indebted, and the other was to a young prince to whom the world owed nothing. However, the Westminster Abbey authorities prevented Caxton's tablet to be erected within the Abbey in 1820; but the nation was not to be even then readily insulted, for the authorities of St. Margaret's Church gladly accepted the trust; and there it rests to this day.

The next thing noticeable is the total absence of any reliable item referring to the family of our printer. It is true that in the first year's accounts for 1478-1480 we find "Item the day of burying of William Caxton" for two torches and four tapers "at a lowe masse," twenty pence, and this William Dibdin assumes to have been our printer's father. In 1464, at the burying of "Oliver Cawston," 8d. was received for four tapers; in the first year of the Guild accounts (1475-1478) a "John Caxston" paid 6s. 8d. upon admission as a brother; in the first year (1490-1492) there was received "atte bureyng of Mawde Caxston" 3s. 2d. "for torches and tapres," and in the second year (1494-1496) "atte burying of Richard Caxton," 2d. These, with the entry relating to the printer himself, are all that can be found relating to the name in any of the accounts preserved between the years 1460 and 1510; but whether either of them was a relative to "our" William Caxton it is impossible for us to say.

Having thus given a few details relating to the man himself, we now propose illustrating the times in which he lived among us at Westminster, by aid of the parish accounts between the years 1477 and 1492, for the preservation of which the authorities of St. Margaret's are to be commended, seeing that that parish passed through, and was most closely associated with the men of, a former age who in troubled times were little respecters of ancient records, ancient customs, or even persons themselves.

In giving in print for the first time many curious items from these interesting books, which Mr. Noble has very carefully extracted, we would but remark that the reader must judge for himself of the relative value of money of four centuries ago and now, for no reliable valuation can be given. It must be presumed that from ten to twenty times would probably be the limit, according to the article or circumstance of the case. Sir N. H. Nicolas, who in 1830 edited the wardrobe accounts of Edward IV. and the privy purse expenses of Elizabeth of York, gives some equally curious items to those we now give. For the support of the queen's two nephews and niece, two female servants, and a groom, 13s. 4d. a week was allowed! The board wages of the "Fool,"—by no means a fool,—was 2s. a month. A surgeon's fee for going from London to Richmond to visit the queen was 13s. 4d., while workmen's wages were at the rate of 6d. a day! A pair of shoes for the fool cost 6d., and a pair for the queen 1s. Beer cost 2s. 8d. a barrel, while two shirts cost 1s. 5d.; and sixteen rowers for conveying her majesty in a barge from Baynard's Castle to Westminster in 1502 had 4d. each, and the master 1s. 4d. These prefatory notes will give the reader some idea of the interesting contents of the Westminster parochial accounts, which we now intend to quote.

1478-1480.

This account is from the 7th of May, 1478, to the 18th of May, 1480 (John Wycam and Nicholas Wollestroft being churchwardens), and consists of forty-five written quarto parchment pages. The first year's receipts amounted to 33l. 16s. 4d., and the second year's to 34l. 13s. 2½d.,—and a farthing at that date was an important item. The payments for the two years came to 21l. 12s. 6d. and 23l. 6s. 7d., leaving a balance at the end of the account of 23l. 10s. 5½d. in favour of the churchwardens for 1480-82. And although all the items appear very trifling, they were not so at that date. William Caxton was one of the parishioners present at the audit.

The general account of receipts chiefly consisted of payments made for torches and tapers used at the burial of the inhabitants; but at the end of the accounts there were seventeen items owing, the whole of which was but 3l. 12s. 4d. They would thus appear to have given credit for such matters at that day; for "William Sampson Brewer in Totehilstrete oweth for the buriall of his child, for 4 tapers, 8d." [In all cases we shall use modern figures in specifying amounts.] Then, again, we find "the wife of Nicholas Wollestroft oweth for his burying 10s.," and "for 4 tapers at the moneths mynde of the same Nicholas, 12d." In the first year's

receipts we find there was received "the day of burying of William Trollop for 2 tapers," 2d. May we be permitted to ask what relation was this William Trollop of 1479 to the celebrated builder of the same name in the same parish 400 years afterwards? "The brynging in of 2 straunge torches in the chirche at crystynyng of a child" was 8d., and "for 4 tapers w^{t} our lady candilstykkys," 3s. 4d.; but what the occasion was at which they were used is not specified.

The burials of individuals ranged from 2d. paid for two tapers, "at the burying of Elizabeth Dennam," to the extravagant sum of 17s. 2d. paid "the day of burying of John Wytteney for 4 torches and 4 tapers, and the pytte and the belle," consequently, Westminster that day was witness to "a grand funeral." "The yeres mynde of Sir Thomas Grey for 4 tapers," cost 12d.; and this year's mind was the religious ceremony in the church, held on the anniversary of the knight's death, when his soul, his wife's soul, his mother's and father's souls, and all Christian souls, were probably prayed for. For "burying of a child from Saynt Albons" 2d. was received; and if this meant St. Albans, Herts, the child was brought (for those times) a very long way. In all these accounts the vast majority of funeral payments were 2d., and sometimes the entries were very vague about names; for instance, "one Crystopher of Knyghtbrigge," and "a brewer's wife fro. Charyng Crosse," the latter costing for four tapers 8d. The burial of "John Shordyche" cost 2d., while that of "Sir Alexander" was 4d.; but the most interesting entry of this year's account is "Item, the day of burying of William Caxton for 2 torches and 4 tapers at a lowe masse," 20d.; and this is supposed to have been the father of our printer.

In the second year, the "burying of Robert of the Covent [Convent] Kychen for 2 tapers, 2d.," and the same for "Isabell Braye,"—and at this early date the Bray family was a noted one in the parish. When a parishioner was above the ordinary folk, and could afford burial in the church, he was favoured with a "pytt," as the grave was called, for 6s. 8d., and as a rule his "knyll with the belle" was rung, which cost 6d., as was the case with one Richard Cowper. "A Mayde of the Swan,"—a noted tavern in the parish,—was buried this year, and there was paid "for 2 tapers 2d." as usual.

Another source of receipts was "The Comon Gadering,"—being collections made on feast days and holidays: Pentecost, St. Margaret, All-Hallows', Nativity, Good Friday, and Easter Day, the latter being the grand day. The two years' receipts amounted to 19*l.* 7s. 11½d., of which nearly a half was collected at Easter.

Pew-rents were then in existence, of which there are twenty entries the first year, and forty-three the second. According to position in the church, so they appear to have been charged, some being 12d. and some as high as 3s. 4d. Thus "William Cowper for a pewe for his wife" paid a shilling, and "John Breght for his pewe" 3s. One entry reads, "Thomas Bough for an ouyr almy under the foot of o^{r} lady of Pyte to kepe brede, wyne, and wexe for straung^{e} to syng w^{t}, 12d."

Under the heading of "Bequests" we find one giving 20d. and another 20s. Others gave various articles (as Caxton did in 1491,—copies of his book). Thus we find "the guyfte of John Wardrop a playne towell conteyning 3 yerdys," while the wife of John Taillour gave another towell of diaper eight yards in length.

The "Dyvers Payments" which were made during the same period are interesting. In the first year "to 4 men to bere 4 torchis on Corpus Xpi day, 4d."; and "in Wyne to the Syngers the same day, 4d." Throughout these accounts we shall see many entries of payments for wine, ale, bread, and such "creature comforts." The two clerks and beadle received amongst them each quarter 5s. St. Margaret's-day was then a high festival in the parish. The first year we find "to John Greve for a rewarde for the Clothe of Arras at Seynt Margrets day, 2s."; and "to a man *for a day* at the hangyng up of the saide Clothe and takyng downe, *and for brede and ale to them*, 6d." In the second year, "for brede, ale, and wyne into the rode-loft on Saynte Margrets day, 12d.," while these refreshments were preceded the night before by a more elaborate, if less costly, entertainment. "Paid in expenses at tavern on Saynte Margaret evyn upon the Syngers of the Abbay, 8d."

Here are a few entries that may interest our building friends:—

"For a new dore at the hedde of the steple and lok to the same dore 2s. 1d. For a dore in the rode lofte to save and kepe the people fro the orgaynes, 12d. For half a hundred of 6d. nayles, 6d. For makyng of a new dore for a pewe, 8d. For makyng of a newe staire in to the rode lofte and the stuffe, 30s. For a pulpytte in the chirche-yerde agenst the prechyng of Doctour Penkey, 2s. 8d. To a carpynter for makyng of a rofe ovir the new steir and the tymbre that wente thereto, 2s. To a dauebour and his man for four dayes at the same staire, 4s. 4d. For a lode of lome, 4d. For 100 lathe, 6d. To Nicholas Plomer for a gotter over the newe staire, and 4 faggots to make fire, 5s. For makyng of a keye for the chist, 4d. For a lokk w^{t} 2 keyes, 20d. For 3 barrys in the wyndowe at the staire-hedd weying 12 lb. pce. the lb. 2d., = 2s. For a hope of yron for the holy-water tubbe, 4d. [The hooping of the holy-water tub was an annual charge.] For 6 holy-water spr^{y}nkyles, 6d. To a carpynter for makying of the crucyfix and the beme he standeth upon, 40s. For kervyng of Mary and John, and the makyng newe, 33s. 4d. For the gilding of the same Mary and John, the crosse, &c., 6*l.* 6s. 8d. For takyng down of a beme in the body of the Chirche afore the crucifix, and settyng up of a new cople arche wyse, and borde to sealyng thereof, and other stuff, 26s. 8d. For naylys, stapuls, bolts, and other iryn worke, 6s. 8d."

Among other items of payments we find 4d. was paid "for holme and ivy at Cristmas." "Cotyn candyll for the lantern for alle halowen tyde to Candylmas," cost 12d., and "the lamp bason" 8d. "For mending of glasse wynddowys aboute in the Chirche" cost 4s., and this also appears to have been a frequent charge upon the account. "To Mathew Metyngh$\bar{m}$ for playing at the Orgons when we had butt one clerk," 8d. "For brede and wyne on holy thursday when pcession was done," 8d. "For 4 torchys weying 83 lb. pce the lb. 4d." "For mendyng and makyng clene of the small organs" 12d.

"A Tyler and his man for a days werk upon Seint Margets ile" received 3s. 1d., while "the wyfe of the Balle for pavying tyles" was paid 3s. 4d. Two dozen candles at Christmas cost 2s., but they were probably of larger size than we burn at the present day.

Such are a few of the interesting items derived from the accounts of the parish the year following Caxton "opened shop" in it as a printer. We have said that the book itself is comprised of forty-five written parchment pages. The cost of the book as well as the writing of it is set down at the end in these words:—"To Paule Asshewell for wrytyng of the boke of Accompt, 6s. 8d. For Pchement to this boke, 14d.,"—both payments, it will be acknowledged, not being excessive.

1480-1482.

The next accounts which we find in the volume are stated to be from the 18th of May, 1480, to the 23rd May, 1482, William Garard and William Hatchet being churchwardens. Although there are only twenty-four written parchment pages, and of smaller size than the first-quoted accounts, being, in fact, 8 in. by 11 in. in size, yet the entries are written closer and more compact. The total receipts for the two years was 65*l.* 5s. 2½d., and the payments 49*l.* 13s. 10½d., leaving a balance of 15*l.* 11s. 3½d. When the book was made up there were but two burials owing for, one of which was "Richard Hunt, yeoman of the Crown," 10s.

In the first year's ordinary receipts we find, "the day of burying of a man that was slayne in Saynte Jamys felde, 2 tapers, 4d.," and "of a childe of knyght brigge, 2 tapers, 2d."; "of lewys Welyngton, for 2 tapers, 2d."; "for the knelle of Thomas w^{t} the grete belle, 6d."; and "for 4 tapers," 4d. At the burial "of Sir Thomas Cleyton, pste [priest], for 4 tapers," 20d.; for 2 torches, 2s., and "for licence of 4 torches of Seynt Anne," 4d.; at the "Crystenyng of Maistr Chamberlayn childe," 12d. was paid for 2 torches.

There are two interesting entries in the second year; one gives the value of old silver, the other refers to the rent of a house. The former reads: "Item the same wardeyns charge theymself w^{t} broken sylver, whiche was of the olde Crosse, weying 68½ unces, pce the unce, 3s. 6d. = 11*l.* 19s. 9d." The other entry tells us,—"the forsayde wardeyns chargith theymself of rent of the tent, called the sonne, payd by the handys of Robert Bromflete by all the tyme of this accompte, 7*l.*,"—that is, seventy shillings a year.

The collections on the "Gaderyng dayes" brought in during the two years 20*l.* 14s. 8½d.; while the pew-rents (9 the first year, and 47 the second) produced 4*l.* 8s. 8d. Of these, we find our scribe, "Paul Asshewell, for his wifes pewe," paid 16d., and we also learn he was himself a Public Notary.

The bequests in the two years only amounted to 13s. 8d., viz., two money gifts of 3s. 4d. each, and two gifts of a somewhat curious nature. One "of Baynbrigge, a pece of tymber," which was valued at 12d.; and the other, "of John Greve, a marble stone," valued at 6s. What the churchwardens did with this marble stone we are unable to say.

It was no uncommon thing for the church goods to be lent out in these times, for there is an entry of "a Rewarde of the Lord Berkeley for a vestment and a chaleys," 12d.

The payments are as varied as usual. A lantern cost 9d.; a lock with key for rood-loft, 6d.; "a fire panne," 6d.; "for makyng clene of the Chirche yerde," 20d.; mending a pew in the church, 2d.; mending the velvet above the sepulchre, 4d.; and the glass window in the rood-loft, 4s.; two red skins "for 2 stolys in the quere" cost 8d.; and 4 yards of green fringe, with nails and making, came to eleven pence more.

We can readily believe the condition of the churchyard at that date, and at certain periods of the year, when we read such entries as this continually occurring:—"For carrying awaye of dungge in the churcheyerde, 4d."

A chain to the church-door cost 3d.; a rope for the little bell, 6d.; hanging of the bells cost 5s.; and "a balderyck to the grete bell, 6d."

St. Margaret's Eve this second year was attended by the singers of the King's Chapel, and the wine which was by them "drunkyn at Robert Whityngton" cost 2s.; and for the wine had for them the next day in the rood-loft, 16d. was paid; and "when even songe was done" at Thomas Burgesy's, 2s. 4d.

Of course, there were several "pits" opened in the church for the burial of the aristocrats of the parish, and for paving these over, John Faydar received 3s. 2d., and in this sum we presume stone was included. The special paving over of "Jone Witteney's pitt" cost 8d.

We have already given the extract relating to the breaking up of the old cross, and we now come to the entries relating to the purchase of the new one. "For the new crosse, weying vi^{xx}x [130] unces pce evry une v^{s} [5s.] sm.," 32*l.* 10s. Now for this elaborate piece of work it was necessary to clean up the staff, the painting of which cost 20d., while "for gyltyng and burnyshing of the upper parte of the crosse staffe and burnisshing of the fote of the crosse," cost 4s. more.

Mr. Ashwell received 6s. 8d. for writing the account, and 12d. was paid for the parchment.

1482-1484.

"Here folowith th accompt of William Burghm and Thomas Crane, wardeyns," &c., from 24th May, 1482, to 24th May, 1484. This is written in twenty-six folio pages by our old friend Ashwell, and William Caxton attended the audit. The two years' receipts amounted to 66*l.* 11s. 10½d., and the payments, 47*l.* 11s. 5½d., leaving a balance on the right side of 19*l.* 0s. 5½d.

Among the general receipts we find, for 4 tapers, "at the yeres mynd of Richard Humfrey fader and moder," 12d.; "the day of burying of a poore woman w^{t} in grete Maude in totehil strete," 2d.; "at the burying of John Shordyche wyfe," for 4 tapers and two torches, 5s.; "a man at the vyne gardyne, 2 tapers," 4d.; "of Thomas, of the Convytte house, 2 tapers," 2d.; "of a preist onte of Chanon Aley, 4 tapers," 12d.; "for 2 torches for the same preist to brynge him to the chirche," 16d.; "of John Nicolas, yoman of the Crown, for 2 tapers," 4d.; "of James Halywell, for 4 torches to brynge hym to chirche, 5s.; for 4 tapers, 20d."; "of Sir Willim Hopton, tresorer of the king's howse, for his pytte in the chirche, 6s. 8d.; for lycence of 24 torches and 4 tapers, he gave to the chirche 2 torches; for his knylle, 6d."; "the day of burying of longe Jone, for 2 tapers, 4d."

"The Comon Gaderyng day" receipts produced, in the two years, 20*l.* 4s. 9d., and the pew-rents (twelve items the first year and thirty-seven the second), 3*l.* 16s. 10d.!

"The bequests" only amounted to 18 yards of diaper, and from two donors, in the second year.

With regard to the payments, "three bondys of iron to the hatche at the chirche dore" cost

8d., and "for the amendyng of the glasse wyndow at the west end of the chirche" 9d. was paid. "For amendyng of the pulpet and the amendyng of the Holy wat' stykkys, 3d." "For the pformyng of one pane to a glasse wyndowe in Saynte George's Chapell, 13d." A tiler and his man for a day and a half's labour received 1s. 6½d.; while two masons for four days in our lady chapel received 4s.

Bookbinders' charges could not have been very excessive, especially when we find, "for coveryng of a boke called a 'Legend,'"—a copy of the first edition of Caxton's celebrated work then just issued from his press,—only cost 20d., and yet "for byndyng and coveryng a masse boke" 3s. 4d. was paid. It must be borne in mind, however, that it was binding meant to stand the rough usage of ages, and not to fall to pieces almost as soon as the book was opened.

"Paide for silkes to the Abbay, 12d.," "for the amendyng of the clothis before Seynt Margaret and Seynt Katyn (Katherine), and for corde, 12d."; "for makyng of the purpell chesyble, 2s.," and "a yarde of bokeram, 4d.," are a few of the drapery entries.

"Makyng clene of the chirche yarde" cost 5d., and "a lode of gravell to lay at the chirche dore" cost 4d. By the entry, "glasyng of the clerke's chambre wyndow," 6d., we presume that gentleman lived within the precincts of the church itself, a supposition well founded, when we shall presently find a bedstead provided for the bed which a good lady had very benevolently given for his use.

Among the items we find the foot of the cross mended, at a cost of 10s. 10d.; a torch weighing 12 lb. cost 4s.; faggots cost 6d.; a new wheel to the little bell cost 5s. 4d.; "a new key to the cofyn that the tapr's is in," 3d.; a ladder, 9d.; setting up the candles at Christmas, 4d.; to the smith, "for claspys to the lyttel belle," 8d.; mending of the church wall, 8d.; and last, but not least, "on Seynte Margret's day one galon wyne and a half," 15d., and this was in addition to the usual "refreshers" then given to the singers and other officials at the festival. Throughout all these accounts we shall see the good old dignitaries of St. Margaret's parish never forgot "the inner man," no matter what the times were.

Our space, however, being exhausted, we must now bring the first part of our memorial to a close; but the subject is so interesting, and the other accounts are so full of very curious particulars that we may give in another article the extracts kindly placed at our disposal. When we bear in mind that Caxton's own eyes looked over these parchment pages, and that he probably handled them four centuries ago as one of the privileged inhabitants of St. Margaret's parish, we cannot be wrong in considering them of great interest.

PROGRESS OF ELECTRIC LIGHTING.

The electric light is making a progress that is all the more sure because it appears to have outgrown the sensational or stock-jobbing stage. Different inventors, having successively discovered that there is no royal road to fortune in electric lighting, any more than in any other matter that requires long and patient study, have betaken themselves to the wiser effort to improve working details. At the same time, scientific theory is undergoing a gradual change; and things once regarded as mathematically impossible are now, at all events, transferred to the alembic of experiment. It is certain that we are a long way from having arrived at an exhaustive knowledge of the phenomena of the transmission of the electric current. Another point of no small importance is the observation of the difference between intensity of light and useful illuminative power. This difference, which at first was almost entirely overlooked, at all events by the public, has been happily compared by Mr. Barlow, in his inaugural speech as President of the Institution of Civil Engineers, to the difference between specific gravity and weight.

The latest improvement in the lamp, candle, regulator, or by whatever name the radiant focus employed for the production of the electric light may be termed, is that of M. Jamin, a French inventor. M. Jamin uses parallel carbon rods, so arranged as for the combustion to take place at the lower extremity, and to travel upwards. This, indeed, was effected by Staite and Edwards, in 1846, the carbons being made to approach one another in the form of a V. But in the Jamin regulator a step is taken in a new direction, and one as to which it is not easy to predict the ultimate results. Advantage is taken of what, for want of a better word, may be called the magnetism of the luminous arc,—a quality which has long been the subject of private experiment. A wire conducting a current of electricity is introduced as a sort of frame around the Jamin candles; the effect of which is to attract the luminious arc, and to keep the combustion to the lower part of the carbon. Persons who are interested in pursuing this very significant feature in the electric light should study the magneto-electric experiments made in connexion with the aurora, which are detailed in a book on "Auroræ, their Characters and Spectra," which was published by Messrs. Spon late last year. A number of interesting and delicate experiments are described in that book as to the action of a magnet upon the electric glow in vacuo, and on the spark at ordinary pressure. The general result of the experiments was to prove, assuming the aurora to be an electric discharge, the great influence that the magnetic forces may exercise on the colours, form, motions, and probably the spectrum also, of that phenomenon. This investigation, which Mr. Capron, the author of the book, has been pursuing as a scientific analysis connected with the natural phenomena of the Northern Lights, has apparently be enapplied by M. Jamin to the practical purpose of modifying the play of the luminous arc of the electric lamp. The subject is so new, so subtle, and hitherto so little studied, that we can do no more than thus briefly call attention to it, with the intimation that it is far from improbable that the great defect of the electric light,—its unmanageable intensity, — may possibly be remedied by the application of magnetic influence to the flame. When Geissler tubes were submitted to the action of the magnet, the stream of light was observed to contract and to change from a rosy tint to a distinctly blue violet. With a hydrogen tube under experiment, when the magnet was excited, the spectrum grew much fainter, the continuous glow in the red and blue, and the red and blue lines, nearly disappearing; and the line in the green alone shining out conspicuously. A longer tube was tried with similar effects, except that the diminution in brightness was not so conspicuous. We recommend all those electricians who are seeking to convert the fierce intensity of the electric light into an equivalent of a more quietly illuminating power, to make themselves acquainted with the experiments detailed in Mr. Capron's book.

The accounts given of the conversion of power effected by M. Jamin's regulator are extraordinary. An engine of 8-horse i.h.p., giving 1,000 revolutions per minute to a Gramme machine, is said to be able to sustain from eight to ten Jamin lights, each equal to sixty Carcel burners, or 576 sperm candles. With the same horse-power, and a speed of 1,500 revolutions per minute, twelve lights were maintained, each equal to forty Carcel burners, or 384 candles. The engine was then driven at 2,000 revolutions, with sixteen lights arranged in two circuits, when the light produced was feeble. It is expected that a Gramme machine constructed expressly for this regulator will produce better results. The wire used at 1,500 revolutions is only one millimètre in diameter, to sustain six lights on a circuit of one kilomètre. With a speed of 2,000 revolutions per minute, and the same thickness of wire, it is said that the lights can be maintained on a circuit of four kilomètres. With a wire of double the thickness, or two millimètres in diameter, it is asserted that the circuit can be enlarged to a length of sixteen kilomètres, or 9·6 miles.

The carbon rods consumed in the Jamin lamps are produced at the price of a penny per mètre. The cost in consumption is said not to exceed a halfpenny per hour. This, of course, is for the carbon alone,—the wick, as it were, of the electric light, — cost of engine-power, maintenance, and interest on capital having to be added. The result compares very favourably with that of other electric lamps. Thus, in the Serrin lamp the cost of coal and oil is given at 1s. 2d., while the consumption of carbon for the same time, for four lamps, cost 1s. 3d. This was for two lamps, burning for four hours, and fed by a 6,000-candle power Gramme machine. At the St. Lazare station of the Western of France Railway, at Paris, six lights are maintained from a 12,000-candle power machine on the Lontin system. There the cost of carbon is 1½d. per light per hour, or 8d. for the six lights; while the cost of coal and attendance for the same time is 2s. This comes in all to 5½d. per light per hour, which interest and depreciation on first cost brings up to 8d. per light per hour, the light in question being rated as equal to 480 candles. In this case, 42 per cent. of the light produced is wasted, being obscured by the opal globes, used in order to avoid injury to the eye from the great intensity of the light.

The Brush system of electric lighting has been the subject of satisfactory experiment in the South Kensington Museum. One of the courts in this building, which was formerly lighted by 1,700 gas-jets, is now, we are told, illuminated by eight Brush lamps. The gas consumed by the 1,700 burners, at 2½ cubic feet per hour, would be 4,250 cubic feet, which at 3s. 4d. per 1,000 cubic feet amounts to 14s. 2d. The electric light is said to cost only 3s. per hour. It is possible that all expenses are not taken into account, but even if we doubled the allowance the margin is such as to call attention very forcibly to the advantages offered by the Brush system. The Werdermann light, moreover, which has always struck us as one of the most agreeable yet produced, has been lately improved by the construction, by M. Gramme, of a dynamo-electric machine especially intended to work his system of illumination. As a rule it is reckoned that half a horse-power will maintain a Werdermann light of 300 candles. If this be the case, there is likely to be a considerable demand for gas, not as the direct, but as the indirect, agent of illumination; the heat given out by combustion serving to work the dynamo-electric machine that produces the light.

While advance is thus being made all along the line, we must confess that it appears to us that the great object which the electrician has need to place before himself is that of the conversion of intensity into quantity of light. That this may be effected by applying the inductive, or secondary, power of the regenerative current to produce a modification of the flame, we think, is indicated, if not by the lamp of M. Jamin, at all events by the experiments of Mr. Capron. We need hardly dwell on the results that will follow any substantial discovery in this direction.

THE REPORT TO THE METROPOLITAN BOARD OF WORKS ON THE RECENT GAS EXPLOSIONS.

A joint report to the Metropolitan Board of Works has been presented by Sir J. W. Bazalgette, their engineer, and Mr. T. W. Keates, their consulting chemist, on the subject of the recent gas explosion in the vicinity of Tottenham-court-road. The report gives the one new statement that the cubical contents of the whole main involved in the explosion were between 14,000 and 15,000 cubic feet. As any mixture of carburetted hydrogen gas with atmospheric air which contains from 7 to 25 per cent. of the gas is explosive, it is therefore estimated that some 2,000 cubic feet of gas mean time made its way into the main. The reporters cannot suggest any mode in which the gas can have thus made its way into the main, excepting through the valve in Howland-street. The destruction of this valve by the explosion prevents any definite conclusion from being arrived at on the subject.

The reporters say not a word as to the danger of the disturbance of gas-pipes by the traffic of the streets.

They remark that there is evidence to the effect that seven explosions followed each other with distinct intervals of time between them, and conclude that an explosive mixture of gas and air must have existed at each of the seven points of disruption, and a simply inflammable mixture along the pipe between these points. We agree with the reporters that this is a more natural explanation of the phenomenon than the idea that a general explosion took place along the main, and that the latter yielded only at the weakest points. At the same time, it is not suggested how it can be imagined that seven portions of explosive mixture, separated by long intervals of non-explosive mixture, could have been formed in the main from a single leak at one end of it! This feature of the case demands a more thorough inquiry. So also where the reporters say, "If the gas were in less proportion than about 7 per cent. by volume, or more than 25 per cent., it would burn away quietly, and not explode," it may be asked whether they mean to imply that a mixture of 1 per cent, of gas with air in a pipe would behave in precisely

the same way, if a light were introduced, as a mixture of 50, or 75, or 90 per cent. of gas? In a case accentuated by such misfortune, and by such happy escape from more overwhelming misfortune, it would be well if the official advisers of the Metropolitan Board of Works had given a little more definite and practical information as to explosive mixtures. This is rendered the more necessary from the intermittent nature of the explosions; and we cannot but urge upon those whom it may concern that this question of successive explosions, whether in the Tottenham-court-road case, the Bilston case, or the case of the Frameries Colliery (p. 100, *ante*), ought to be made the subject of accurate experimental investigation. It would be little short of a scandal to science to remain satisfied with the hypothesis that, *somehow or other*, in defiance of the laws which have hitherto been held to regulate the interpenetration of gases, a dribble of coal gas into a pipe would form a series of seven puddles of explosive mixtures, separated by just such a mixture as would burn like a slow match!

When the series of phenomena in the two cases are compared, the idea suggests itself that each explosion must have had a distinct effect,—mechanical or chemical,—on the unexploded portion of the gas. Thus, for instance, looking at the different specific gravity of the carburetted hydrogen (which is 0·4381) and of air (which is taken as unity), it is conceivable that either the lighter or the heavier gas should have been so much more readily acted upon by the force of the explosion as to have been driven through the mixture until it accumulated in an explosive proportion.

We do not, in suggesting this explanation, at all venture to assert that such was the case; but the phenomena are, as yet, altogether unexplained. We may hold, and do hold, that mixtures of different proportions were present, within the interval of time that separated the first from the last explosion, in different parts of the main in one case, and of the colliery workings in the other. We do not think that this state of things can have been caused by the uninterrupted action of a leak in a valve, or of a blower from one portion of the mine. Science will be extremely imperfect until the cause of the intermittence of the explosions is made clear. We suggest what seems to us a possible physical cause. We shall be glad to hear of further investigation being directed to the subject.

The final recommendation of the reporters against testing gas-leakage by open flame is one that we think should have the widest circulation given to it. Such a proceeding might, with advantage, be made subject to heavy penalties. But with regard to the applying anything of the nature of a jet to the stand-pipe, it should be remembered that this would tell nothing as to the contents of the main without they were under pressure. If this be forgotten, what is suggested as a test for safety might lead to disaster.

FROM THE BANKS OF THE SEINE.

Were the French public not accustomed to the enunciation and practice of somewhat startling political theories, they would have reason to be indeed alarmed at the account their daily papers have recently given them of the resolutions of the several working-men's congresses which have been held within the last few days at Paris, at Lyons, and Marseilles. The English householder would be scared to have served up with his comfortable coffee and his hot rolls or his toast such printed imprecations and threats as those to which the delegates to these congresses have given free vent. Fortunately, however, the whole agitation has met with general indifference on the part of the public, if not of the professional world. The Paris congress continued, to the day of its close, to breathe, against all remonstrance, the same threats, and prescribe for the sickly state of our social system. It was not, however, without further startling us by the enumeration of some really refreshingly novel views that the congress was to break up. "Every workman who saves money is a robber, and commits a crime against the State," was one of the last deliberations of the congress. What the laborious and thrifty workman has placed in the savings-bank, he has robbed from the "collectivity," for if he had spent his savings he would have occupied a certain number of his fellow-workmen. One delegate even defied those about him to point out any single object, "however small, which, possessed, is not branded with the same infamous stamp." It is evident, therefore, that, in the minds of the collectivists, the definition of Proudhon, that "property is robbery," is an accepted axiom. The views of the congress on *salaries* are equally worthy attention. According to the congress, a good workman must not not be paid more than the bad,—a designer and brain-worker more than the navvy,—the architect more than the mason or the bricklayer; and all this on the ground that the good workman alone owing his special talents to the education he has received or to the surroundings in which he is placed, it is "collectivity" which has given him the power of making use of his talents. Had M. Garnier not had masons and carpenters at his disposition, urged one delegate, it would have been impossible for him to have built his Opera-house. Whether the sketch of this "collectivist equality" reigning among mankind at large has or has not been drawn from the life at a well-arranged convict prison, we know not, but certain it is that there will be found in perfect working order this admirable system of equality in the acknowledgment of talent. There, special individual powers are little taken into account; the same hours, the same work, the same routine, is imposed on all alike. In this well-ordered existence a democratic equality of salary reigns supreme; one sole difference can be drawn between this system and the application of the "collectivists'" doctrine. Under our existing laws the equality of prison rules is alone inflicted on criminals; the worthy "collectivists" would seem to wish to apply it to all honest workmen, laborious inventors and creators, and the rest of society at large. Needless to say, that to attain this cherished ideal, insurrection is seen to be the sole means; when insurrection will have killed thousands upon thousands of men, the survivors, if they carry out the programme of the Paris congress, will have nobly acquired the right, not to gain money, still less to economise, but to have nothing that any one can call his own, naturally not even his family; perhaps the words "my" and "mine" will disappear from conversation; he will, however, have the honour, as an evening paper wittily observed, of being one of the occupants of the convict prison of the future. The firm protestation of M. Dronet, which was mentioned last week, has not remained unsupported; among the protestors an unexpected ally arose in *Citoyenne* Rouzade, who, in the course of her well-expressed address (in which naturally the rights of her sex were set forth), rated the "anarchists" so warmly in showing their weakness in imagining that any system "can destroy the causes of division, which are inherent to human nature," and in further showing how "the realisation of their views would lead to the complete extinction of society," that she gained, curiously enough, a round of applause. But this is not the sole protest to add to that of the Havre delegate, whose action has been since fully approved in an admirable letter addressed to him from Havre by the "federal commission,"—a letter of which one passage merits notice. "Taught by the events of history, which have showed us that violence has never founded any durable state of affairs, we have decided to demand the just reparation of the abuses from which we suffer, solely by the methodical organisation of our forces under the protection of the just laws which we claim, and which we will obtain by pacific means, since we know the value of our voting-ticket." In our last letter we urged on English readers the warning that the opinion of the great majority of workmen and artisans in France must not be judged by the inanities expressed in these congresses of so-called "working men." The true-hearted and thoughtful workers have hastened to protest warmly against the violences expressed. With M. Dronet's withdrawal, the trade committee of the bronzeworkers, after mature consideration, addressed to the congress a reproof of its "bad action" in helping the supposed common cause. It is satisfactory to feel that the real workers repulse any idea of associating their views with those expressed by the congress, and which if they do not meet with the same indignant protest, pass off in the midst of indifference.

Among other exhibitions, the competitions for the various "Prix de Rome" in painting, sculpture, architecture, and engraving, have attracted within the last few days a large number of the students and art-lovers to the École des Beaux Arts. To friends and relations and school-chums these exhibitions may be very interesting; but it is so rarely that any special ability shows itself in these young aspirants for fame, in whom study and a better acquaintance with the works of their great predecessors can alone develop any peculiar talent, that the interest of the July shows at the École is somewhat (with the foreigner at least) blunted after a residence on the banks of the Seine, and a growing acquaintance with the treasures of the Louvre and the other museums. We can sincerely sympathise with the conscientious editor who, unassisted by enthusiastic helpers, desires to give a faithful account of these competitions. We cannot wonder that there should appear some truth in the accusation that conductors of journals are not always warm in the interest they show in such questions, and the untaught artistic world are much more indebted than they sufficiently acknowledge to those editors who freely open their columns to the consideration of the subject. As we have so often remarked, it is the architects who show in their exhibited work the most satisfactory results of their study. Whether these results lead to any real further progress beyond the furtherance of archæological erudition, is a question difficult to decide; but certain it is that after their spell of classical architectural studies at the École, and in Italy or Greece, Classic architecture seems to have no followers when once the student has entered at home the active ranks of the profession.

PUBLIC WORKS ABROAD.

From a series of official papers presented to Parliament, we get some interesting information relative to the progress of public works abroad. Thus, with regard to *Venice*, we note that the public cemetery in the island of San Michele, five minutes distant from Venice, has been remodelled and enlarged. The municipality have set apart three burying-grounds for the interment of the remains of Protestants, Orthodox Greeks, and Jews. The works are actually in a very advanced state, and it is asserted that the cemetery will be completed and opened to all classes within the present year. The repairs effected on the north and south façade of St. Mark's Church, in Venice, as readers of the *Builder* know, have lately been much criticised by English scholars and artists, and by the majority of Venetians, who, in concert with the former, argued that the glow and rich colour of the old marbles and columns had been completely destroyed; that the new marbles employed were unequal to such a magnificent structure; that the priceless old mosaics had been rather rudely refitted; that the part of the pavement anew reconstructed had lost all its original beauty of colour; and finally, that the whole restoration was not carried out with the devotion due to one of the most splendid monuments of Venetian grandeur. On the other hand, it was alleged that when the repairs began the marbles were simply in a state of utter decay; that the rebuilding of the north façade began and was brought to an end under the Austrian rule, and that the Italian authorities had consequently no alternative left but to preserve the same style on the south façade; that it was impossible to replace the old marbles brought there in different centuries by Venetian commodores from the East; that it was not a question to stop for the moment the ravaging work of the time, but, to prevent ruin by a radical restoration; and that, among many other difficulties, not one of the least was the large amount of money required for such a colossal undertaking. The deep interest felt by the English nation in the fate of the most magnificent work of art erected by the Venetian Republic cannot ultimately fail to create a feeling of gratitude amongst sensitive Venetians. The Italian Government have issued peremptory orders to stop for the present all repairs on the principal façade; and a commission for the preservation of ancient monuments was directed to proceed thither, and to report any resolution they may arrive at to the Superior Council for Fine Arts, who will subsequently pronounce a final verdict on the matter.

We further note in respect to public works in Italy that an important activity is manifested in the province of *Cagliari* in the construction of new roads, which are divided into three classes,—the national roads, made by the State; the provincial roads, made by the province; and the ordinary obligatory roads, made by the communes. Of the latter there were completed

in 1878, 38,898 mètres, at a cost of 577,757 lire; there were also completed 43,359 mètres of provincial roads, at a cost of 1,178,277 lire; and several branches of the national roads. The railway works are also rapidly advancing, especially the main line between Cagliari and Sassari; and it is expected that early in 1881 the two principal cities of the island will be united by rail,—a circumstance that will produce a marked improvement in the social and moral conditions of the island; and still more important will be the means of harmonising the feelings of rivalry which these cities entertained for supremacy, as they were almost unknown to each other by the former difficult means of communication,—a feeling which ancient Governments did not seek to appease, but rather fostered, in order to keep the Sards divided among themselves. In point of roads, then, and means of communication, the island is making rapid strides, and will not long delay to reap the benefit of such an important work.

According to an official report from *Odessa* a large extent of ground there—now covered by the sea,—is being filled in, on which custom-houses will be built. Quays are being made along the part thus reclaimed, and an additional harbour, to be obtained by dredging, will be protected by a breakwater, in slow process of construction. It would be well if, before proceeding to dredge the new harbour the present harbour were dredged to a sufficient depth. An English vessel drawing 22·4 feet got aground in the harbour, causing much detention and loss of time. A plan for a new theatre has been accepted. It will be very handsome. Extensive drainage works are in course of construction, and are partially finished. The sewerage will be carried many miles out of town. It is hoped the health of the town will be thereby much improved, and also that it will be the means of fertilising a large extent of ground now a saltmarsh. Tramways are being laid in the town, and are to extend to some neighbouring villages. The lines outside the town will probably be worked by steam.

From *Damascus* we learn that, as regards public works, there is little to notice, Government impecuniosity not even permitting the regular payment of engineers. A so-called carriage-road has, however, been made between Damascus and Homo, whence it has been carried on to Tripoli; while another is now being traced out between Damascus, Kuneitrah, Merj Ayoun, Nabatié, Sidon, and Beyrout; the works to be executed by forced labour of the peasantry long the road. The evils attending the want of roads in Syria were amply demonstrated in the case of the district of Latakia, the last harvest of which, instead of being far below the average, as in other districts of the country, was in excess over former years, permitting large exports to Italy during the past autumn. The freight per 100 kilogrammes from Latakia to Leghorn and Genoa was 2½ fr. by sailing-vessel; that from Latakia to Hamah, across the Anegalieh mountains, a journey of twenty-four hours on a good road, but three days by the present track, was 10 fr. The districts of Hamah and Homo are now obliged to import grain from Egypt, involving a sea voyage and a three days' land journey.

From *Kastamuni* (Turkey) we get some particulars about houses. The poorer classes live in log huts, generally built on props, which raise them one story above the ground; underneath, the stable is constructed amongst the props. The rooms are low, with very small windows, a lage fireplace, and a large platform or balcony outside, open to the air; the roof is of shingle or tiles. The better-class houses are built of wooden frames, filled in with sun-dried bricks, and they are panelled inside with wood; they are sometimes plastered outside, and have glass windows. The rooms are generally partitioned off, leaving large open spaces on each floor, so that the communication from room to room is through the open air; this is healthy, but trying in winter. The Christian houses are generally the best, and are built in more European style. At Sinope there are some good houses.

From *Java* we get some information regarding the Batavia Harbour works. Great progress has been made with the construction of the new harbour during the past year, and the engineers in charge deserve credit for the energy they have displayed in overcoming the various obstacles with which they have had to contend. Owing to the inferior workmanship of some of the dredging-mills which had been obtained from Europe, dredging operations were somewhat retarded at the commencement of the year; but this deficiency has been more than counterbalanced by the rapid strides made in the other departments. In the first section (at Tandjong-Priok) the greatest activity has prevailed. The extensive workshop there, consisting of a smithy, a boiler manufactory, a copper foundry, a carpentry establishment, &c., was completed and brought into use early in the year, eighty-five machines driven by steam being daily in motion. A large warehouse was also finished in which the whole stock of working materials, representing a value of about 1,500,000 guilders, was stored. During the latter period of the year the monthly dredging operations averaged about 80,000 cubic mètres; but it is hoped that, ere long, 100,000 cubic mètres per month will be removed under more favourable conditions. An important saving in the cost of the foundations for the breakwaters, and one not calculated upon in the original estimates, has been made by the discovery that the sand dredged from the inner harbour, when amalgamated with the clay-soil on which the foundations are laid, forms a hard resisting substance capable of bearing the weight of the trachyte superstructure without sinking, so that a considerably smaller quantity of this stone than originally expected will, in all probability, be required to complete the piers.

ARCHITECTS AND CONTRACTS.

The following letter, signed "A Householder," was printed in the *Times* of Saturday last, and was commented on in a leading article:—

"Building Difficulties.—Sir: Why is it that no effort is sufficient to obtain accurate knowledge as to what will be the cost of building or repairing one's house? Allow me to state the difficulties which, in my own experience, attended the alterations of a house. We once thought we should like to have two new windows thrown out in the drawing-room and a slight alteration made in our stable-yard. We consulted a builder, who presented us with a very neatly-written estimate, apparently full of the frankest details. The cost was to be 50*l*. The paper looked exceedingly encouraging and pleasant, and with light hearts we embarked in the scheme. We endeavoured to keep an eye on the workmen, and acted as our own clerk of the works. It was just a month before the work was done, and we saw the men clear out. The bill sent was by no means so clear and frank a document as the promising estimate. The cost of our windows, &c., was about 100*l*. Our friends console us by telling us that they have known much worse cases."

Inferentially, the *Times* gave its correspondent a proper answer in saying, "Few men are competent to be their own architects. They will generally repent it bitterly if they dispense with professional advice." But then, unfortunately, it goes on to assert that the result, so far as increased expense is concerned, and so far as regards the impossibility of learning beforehand what will be the cost of building or repairing one's house, will be precisely the same even if an architect be employed. "Most buildings," the writer says, "are erected under arrangements which naturally and almost inevitably terminate in such a manner as we have described"; namely, that "the total cost" (though there have been drawings, specifications, bills of quantities, and contract), "is about twice as much as that which was contemplated or, as the owner thought, was bargained for."

Now, this is not true. The *Times* article is written with moderation, and, doubtless, in perfect good faith; it admits that "no more honourable body of men than architects exists"; but it is founded on insufficient knowledge. The writer judges all from a few. We assert unhesitatingly that building operations are completed every day of the week, whereof the cost, so far from being twice as much as was contemplated, does not exceed the amount agreed upon except to the extent of the cost of additions or alterations made by the employer. The answer to "A Householder's" first inquiry, "Why is it that no effort is sufficient to obtain accurate knowledge as to what will be the cost of building or repairing one's house?" is, that it starts upon a false assumption. Without any great effort such knowledge can be obtained, and is obtained, every day. If the employer himself knows exactly what he wants, employs a competent and honourable architect, conveys to that architect his views, and avoids alterations he need not fear any important addition to the amount of the contract.

ROSLYN CHAPEL.

It will concern every one interested in matters archæological to know that it is proposed to make an addition to this ancient historical monument and most interesting example of Mediæval art.

The chapel, as many of our readers are aware, is merely the chancel of what was intended to be a cruciform church. The west end is entirely destitute of openings, the chancel arch, which is richly moulded and decorated, being built up. This obstruction is to be removed, and a small addition of one bay made to the west end. The carrying out of this plan has been entrusted to Mr. Andrew Kerr, formerly of her Majesty's Office of Works, a gentleman known to be possessed of a fund of antiquarian lore. The purpose of the addition is to provide a baptistery and organ-chamber, the latter of which is much needed, the instrument now in use having suffered greatly from damp. The new structure is to be two stories high, and of the breadth of the central aisle, the organ-chamber being reached by a spiral stair. The baptistery shows on each side a single light window and a western doorway, flanked by small lancets, the roof being formed by the floor of the organ-chamber. The organ-chamber shows at the sides similar windows to those below, and at the west end a circular window, filled in with a cross, will be seen from above the organ. The roof is flat, and the walls are to be lined with pitch-pine, of which material all the wooden fittings are to be formed. The internal walls of the baptistery are to be lined with the old stones, which were used in building up the chancel-arch. Externally the elevation shows a flat roof, with cornice and parapet. The western angles are splayed off, having buttresses at the obtuse angles, which terminate in pinnacles, with foliated finials. On the face of the buttresses are niches, and the same feature appears on the narrow space between them.

What strikes one most when examining the plans is that the whole height of the chancel arch is not embraced by the new portion, the flat roof reaching only to the springing of the arch, and the portion above being filled in with glass. This arrangement has been arrived at with the avowed object of showing distinctly that the addition is no part of the original design. The enriched moulding of the chancel arch will be seen cropping up through the flat roof and the walls on each side, which declare that transepts were intended, are left open to inspection.

Mr. Kerr has given the matter his most anxious consideration, his desire having been to disturb no single feature of this unique structure; for the addition might, at any future time, be removed, and the chapel restored to what it was, the only portion interfered with being the wall which fills up the chancel arch.

While designing the addition to harmonise with the original, Mr. Kerr has abstained from any attempt to rival it in richness of detail.

THE PROMOTION OF THE FINE ARTS IN SCOTLAND.

The annual meeting of the Association for the Promotion of the Fine Arts in Scotland was held on the 28th ult. in Edinburgh. Mr. A. S. Kinnear, advocate, occupied the chair, and in opening the proceedings said he was satisfied that the Association was serving a good and useful purpose; and if they compared the state of public opinion about art as it was now and as it was forty-five years ago, before the society came into existence, they would have no doubt that not only that institution, but every institution and every influence, whether embodied in an institution or not, which had for its object the diffusion as widely as possible of a taste and appreciation for art had been working continuously, persistently, and most successfully for the attainment of that end. Why, it was now an axiom which everybody took for granted, that the love for and enjoyment of works of art was not only one of the most noble pleasures of the human mind, but one which ought to be, and might very easily be, brought within the reach of almost everybody in a civilised community. Now, he was persuaded that was not a senti-

ment which would have met with anything like universal acceptation fifty years ago. There was at that time a very prevailing opinion among sensible and intelligent people that pictures and statues, and even poetry and music, were really toys for the rich, and that people who had their way to make in the world had no time and no money to spend upon such trifles. Now, that was a sentiment which nobody would venture to utter privately or publicly at the present day. And not only at the time referred to were the arts largely considered as mere toys and luxuries for the few; but even the few could not, he thought, be accused of overestimating the importance of those toys and luxuries, at least when they were of native production. At one of the earliest meetings of the Association, the late Dean Ramsay, who always took a great interest in its prosperity, said he had been comparing certain figures, and that, while up to the ninth year of the existence of the society it had expended 36,000*l.* in the purchase of works of art, in a particular year before its establishment, the whole amount spent in the purchase of such works from the exhibition of the Royal Scottish Academy was 30*l.*, and the sister Academy of Arts in Dublin had subsisted for four years upon 30*s.*! Now, it appeared to him, looking at these figures, that there had been very significant and palpable progress in the public mind in regard to matters of art. Although he believed that the capacity for taking delight in painting was universal, or almost universal, still it was a capacity which was not very strongly developed in people who had no opportunity for seeing good pictures; and accordingly, when a society was formed for the purpose of diffusing a taste for art, the best thing it could do, the only thing it could do with any very great and immediate hope of success, was the distribution, as widely as possible, of as fine specimens of art as it was enabled to distribute. Such was the principal purpose for which the Association existed. It endeavoured to attain that purpose in two different ways. It had contributed to the National Gallery many fine works of the greatest of our recent and living Scottish artists; and it distributed, not only all over the country, but all over the world, the works of Scottish artists in the shape of original pictures, and still more largely in the shape of engravings. It was always one of their main objects,—and he thought it was one they would be the last to abandon,—to aid and encourage young artists, whose excellence had not yet obtained acknowledgment. During the existence of the society there had grown up a new generation of Scottish artists, of whose great fame and reputation they were all justly proud; and it appeared to him a remarkable proof of the success of the earlier committees of the society in selecting, among the works of unknown and rising men, those which gave real indications of originality and genius, that, looking back to the earliest lists of the society's purchases, he found among them almost every name which the country and the world now recognised as that of a Scotch artist who had done honour to his country.

The Secretary (Mr. Cornillon, S.S.C.), then read the report by the Committee of Management, of which the following is the substance:—

The subscriptions for the past year, notwithstanding the prolonged depression of trade, both at home and abroad, amount to 4,719*l.* 15*s.*, showing an increase of 70*l.* 7*s.* over the amount subscribed last year, a result mainly attributable, as formerly, to the hearty co-operation of the honorary secretaries. As the presentation work for the current year, an etching after the picture by the late G. Paul Chalmers, R.S.A., "The Legend," now in the Scottish National Gallery, has been completed by M. Rajon. From the recent exhibition of the Royal Scottish Academy the Committee purchased for distribution among the members, at a cost of 960*l.* 1*s.*, twenty-eight works of art, consisting of twenty paintings, seven water-colour drawings, and one bust in bronze. The following are the names of the artists from whom the works selected were purchased:—Alexander Fraser, Robert Gavin, John Hutchison, and Walter H. Paton, Academicians; J. C. Noble and Robert Anderson, associates; George Aikman, Laura T. Alma-Tadema, Jessie A. Brodie, Hector Chalmers, James Cadenhead, J. Jamieson Chalmers, David Farquharson, James Faed, jun., Giuseppe Ferrari, Harry Frier, James Hamilton, E. Hume, G. W. Johnstone, Robert Little, Pollok S. Nisbet, G. Postma, Robert Ross, Sam. Reid, John Reid, Archibald D. Reid, and John Fraser Taylor, artists. In addition to the purchases from the Academy's exhibition, the following original paintings were commissioned by the Committee from the artists, at the cost of 441*l.*, to be included in the distribution, viz.:—"November," by George Reid, R.S.A. (126*l.*); "When the Boats come in," by William McTaggart, R.S.A. (126*l.*); "An Eastern Connoisseur," by W. E. Lockhart, R.S.A. (126*l.*); "Jeanie Gray," by J. H. Lorimer (63*l.*). As regards the engraving for next year, the Committee announce that they have arranged for the reproduction of Sam Bough's "Cattle crossing the Solway," now the property of John M. Crabbie, esq. The execution of the engraving has been entrusted to Mr. Lumb Stocks, R.A., who has contracted to finish the plate in June, 1880, so that copies will be issued to the subscribers for the year 1880-81. The engraving, which will be 20 in. by 14½ in., is to be in line, on steel. The total sum expended up to this time by the various committees of management of the Association in the acquisition of paintings and sculpture for the members, in the purchase of pictures for permanent preservation in the Scottish National Gallery, and in the production of engravings and illustrated works for circulation among the subscribers, now amounts to upwards of 103,000*l.* The sum at the credit of the National Gallery amounts at present to upwards of 800*l.*, including the percentage of this year's subscriptions, set aside in compliance with the terms of the Association's royal charter of incorporation.

The report was adopted, and other business transacted.

THE VAUXHALL GROVE ESTATE.—NEW BUILDINGS AND THOROUGHFARE.

What is known as the Vauxhall Grove Estate, lying between Harleyford-road, opposite Kennington Oval, and South Lambeth-road, is now being laid out for residences, a spacious new thoroughfare through the centre of the estate forming a portion of the undertaking. This thoroughfare will open out an entirely new road between Harleyford-road and South Lambeth-road, and will accomplish a much-desired improvement in the locality, as it will render unnecessary the present circuitous route between Harleyford-road and South Lambeth-road *vid* Vauxhall and the South Western Railway Station. The houses on the estate, upwards of eighty in number, will be in crescent form, and contain three stories each, with bay windows, and elevations in red brick, and stone dressings. Several of the houses have already been erected, whilst others are in progress. The entrance to the estate from Harleyford-road is distinguished by two pillars, on which are inscribed "The Grove." It is stated that another outlet into Fentiman-road, giving access to Clapham-road, is contemplated.

The estate is being laid out by Mr. Archer, architect and surveyor, the builder being Mr. Coombs, who is also the owner of the property.

SALE OF A LARGE WEST END MANSION.

Last week, under an order of the Court of Chancery, Mr. F. T. Galsworthy, of the firm of Messrs. Chinnock, Galsworthy, & Co., offered for sale at the Auction Mart, the spacious leasehold mansion, No. 27, Portland-place, at the corner of New Cavendish-street. The mansion was described as containing twelve bedrooms, six reception-rooms, and an unusually extensive range of domestic offices, the premises having been recently decorated in a very elaborate and costly manner. The property likewise included extensive stabling in Weymouth-mews, comprising a six-stall stable, with coach-house for four carriages, and men's rooms over. The mansion was stated to be held from the Duke of Portland, for a term of forty years from January, 1874, at a rental of 250*l.* per annum. It was sold for 12,550*l.*

THE PAVING OF THE DULWICH ROADS.

PROTEST BY THE INHABITANTS.

The inhabitants of Dulwich are at the present time much concerned by a proposal of the Camberwell Vestry to lay down York paving in the different roads, which, it is urged, would altogether destroy the exceptionally rural character of the hamlet of Dulwich. Last week a numerously-attended meeting of the inhabitants was held in the Hall of Dulwich College for the purpose of opposing the action of the Camberwell Vestry on the subject. Amongst those present were several of the Governors of the College.

Mr. Young, one of the governors, was called upon to preside, and moved a resolution to the effect that the meeting deprecated the idea of laying York paving on the footpaths of rural roads such as those in the Manor of Dulwich. He observed that the feeling of the governors was entirely with the inhabitants in this matter. Captain Bedford Pim, another of the governors, seconded the resolution, which was carried unanimously.

Another resolution, proposed by Mr. Wragge, was to the effect that the Camberwell Vestry should be asked to reconsider their resolution to lay down York paving in all roads taken over by the parish. He observed that it would be a thousand pities to introduce York paving in Dulwich, for a thing which might do very well for Camberwell Green was quite out of place in that district. It seemed to him absurd to say that a rural traffic required York paving. He was sure there was no one present who would like to see that beautiful hamlet converted into a mere suburb of London, but that all of them would very much prefer that it should retain its present rural aspect. Mr. Goodall, who supported the resolution, denounced the proposal of the Vestry as one of spoliation. They might as well talk of paving Kew Gardens with York paving as Dulwich. It was on æsthetic grounds, in opposition to the utilitarian notion that every place should be alike because they were under the control of one Vestry, that he deprecated the conversion of that rural hamlet into a town. He had heard strangers remark that they would not find a more charming aspect of rusticity fifty miles from London. Mr. Whiteley, a member of the Vestry, also supported the resolution, stating that in the Vestry he had often strongly urged that the proposition to have all the footways in the parish, urban and rural, York paved, was monstrous. The motion was unanimously adopted, as also another resolution to the effect that the resolution be forwarded to the Metropolitan Board of Works, and requesting their assistance in preventing the unnecessary outlay which would be caused by York paving the roads in Dulwich.

The general feeling of the meeting seemed to be that asphalte and tar paving was the most suitable for the footways in the hamlet.

TREATMENT OF DAMP WALLS.

An interesting and successful experiment has recently been made in Germany in drying a wall which had become damp from outside through a roof built against it, the saltpetre contained in the lime oxydising and forming crystals on the wall. As pulling down the wall would have been too expensive, the following experiments were made:—The wall was coated with liquid asphalte, which, as is well known, cannot be laid on thin, but is in every respect proof against damp. But as oil colour and asphalt do not agree together, paint not adhering to asphalte, the latter was scraped off with the spattle so as to leave very little of it remaining. The asphalte was then softened and made liquid by means of a red-hot iron, or better still with a spirit soldering-lamp, and at once well rubbed about with a stumpy brush, until the remaining asphalte had the thickness of tissue paper. A plate with red-hot sand was then passed along the wall. The sand heated the asphalte, and as much sand adhered as was necessary to enable another mass to be put on, which otherwise would perhaps have not adhered. Two coatings of spirit lac (shellac and spirit) and Venetian turpentine, specially prepared, were then laid on, so that afterwards oil-colour could be put on, and isolated from the asphalte. The oil-colour, white-lead paint, was laid on thickly, and linen or muslin put on this. Much dryer having been used, the whole was dry in three days, when again spirit-lac and oil-paint were put on, and finally the whole work was treated with the spattle. The wall thus operated on has now stood for two years, and although it is damp on the outside, it remains dry inside. The cost is said to have been 3*s.* per square mètre.

OBITUARY.

Mr. William Moseley, Architect.—We mention with regret the death of Mr. William Moseley, which took place on the 29th ult., at 32, Cumberland-terrace, Regent's Park, in his eighty-third year. Mr. Moseley was appointed county surveyor of Middlesex in the year 1829. He held that office for twenty-five years, and during its tenure built the Female Ward of the House of Correction, rebuilt the House of Detention (formerly the New Prison), added wings to Hanwell Asylum, was the architect of the Surrey Lunatic Asylum at Wandsworth, and of the West Derby Asylum, Liverpool, and was appointed consulting architect to the Commissioners in Lunacy. Whilst in partnership with his brother, Mr. Andrew Moseley, he built the Westminster Palace Hotel, the City Bank in Threadneedle-street, the City Bank in Bond-street, and many other mansions and buildings. He was elected district surveyor of West Islington in 1853, and held this appointment till his death.

NATIONAL PENNY BANK AND ARTISANS' DWELLINGS, CLERKENWELL.

This extensive pile of buildings, at the corner of St. John's-square and Clerkenwell-road, has been opened for business and occupation. The buildings were to have been opened by H.R.H. the Princess Christian, but owing to her Royal Highness's other engagements, the formal ceremony had to be deferred.

The ground and first floors of the building are used for the purposes of the National Penny Bank and three shops, the whole of the upper part of the building (*i.e.*, the second, third, fourth, and fifth floors) being planned for artisans' dwellings,—two sets of two rooms and two sets of three rooms on each floor, with w.c. to each set of rooms. The floor of the second story, separating the artisans' dwellings from the bank premises, is fireproof, formed with 6 in. by 2 in. rolled iron joists, 12 in. apart, filled in with selenitic cement concrete, and covered with joists and wood flooring. The roof flat is also of the same construction, but covered with Lawford's patent asphalte, to form a drying-ground. On the roof flat is the laundry, formed with framed timber, roofed with corrugated iron, and fitted up with four coppers, the water being laid on to each. All the rolled iron joists are supported on cast-iron columns and stancheons. The main staircase is constructed of Portland stone, running in continuous flights from basement to roof, with wrought-iron grille on each landing. Each set of rooms is furnished with cupboard, larder, and coal-cellar. All the rooms are plastered and papered throughout, the corridors having a cement dado 4 ft. high, and painted. At the end of each corridor is a dust-shaft fitted with wrought-iron door, the dust descending to a place provided for its reception in the basement. The roof over the staircase is covered with Broseley tiles. Ventilating pipes are carried from each w.c. to the highest point of the roof, also from the sinks in sculleries.

Externally the facings are stock bricks and terra-cotta dressings, relieved with terra-cotta string-bands 12 in. square, each bearing the device and inscription of "The National Penny Bank." The bank portion of the building has a large projecting bay and circular corner, built with red brick and terra cotta. The building has a frontage of 140 ft., and a height from the ground line to the top of the parapet of 70 ft. The foundation-stone was laid in August last by her Royal Highness the Princess Christian.

The building has been designed by Messrs. Henman & Harrison, architects. Mr. F. Dashwood has acted as clerk of the works, which have been executed by Messrs. Aitchison & Walker, of William-street, St. John's Wood, Mr. W. Woolacott being their foreman.

BLAENGWAWR SCHOOLS FOR THE ABERDARE SCHOOL BOARD.

These schools have been opened by Sir George Elliot. The new buildings, which have been carried out by Mr. J. Morgan, of Aberdare, from the designs and under the superintendence of Mr. E. H. Lingen Barker, of Hereford, the Board's architect, and without the aid of a clerk of works, include lofty rooms, conveniently arranged for teaching purposes, somewhat in the form of the letter H, the central portion being for infants, in two rooms, measuring 58 ft. by 24 ft. and 30 ft. by 20 ft., the wings being for boys and girls respectively, in two rooms each, measuring 81 ft. by 22 ft., and 21 ft. 6 in. by 19 ft.

There are back and front porches, cloak-rooms, and lavatories to each department, as well as convenient offices in the playgrounds, which latter are divided and fenced in with stone walls, the river Gwawr having been bridged over at the entrances, and parapet walls erected on each side.

The walls are built with local stone, in level bedded courses, with a cavity and internal brick linings. Forest of Dean stone has been used for dressing, and the pointed relieving arches over the windows, and the door-arches are carried out with red and white bricks, similar materials in bands being used in the tops of all the gables, the chimney-stacks being of white fire-bricks only. The roofs, which are covered with Bangor slates, are of open description inside, the curved principals being supported on stone corbels, and the other timbers being stained and varnished, and plastered between. The bell is hung under a ventilating spirette, which rises from the centre of the building, the other ventilation, as well as the warming arrangements, being of a complete character.

Accommodation is provided for 754 children, according to the new, and 797 according to the old, Government regulation; and the cost has been, for the school buildings, with their offices, 3,122*l.* 11s. 9d., 62*l.* 11s. 9d. of this amount having been found necessary for additional foundation works. The cost per head has therefore been 4*l.* 2s. 10d., according to the former, or 3*l.* 18s. 4d., according to the latter calculation. The outlay on the boundary and division walls and gates was 250*l.* 11s. 9d., bringing up the expenditure, independent of the fitting up and furnishing of the rooms, and the formation and draining of the playgrounds, to 3,373*l.* 3s. 6d.

PROPOSED EFFACEMENT OF TOOLEY-STREET.

The well-known thoroughfare in Southwark, which for many generations past has been celebrated as the locality of the "three tailors," has just escaped a process of effacement; for at the last meeting of the St. Olave's Board of Works, a notice of motion had been given to the effect "that the Board memorialise the Metropolitan Board of Works that on the completion of the street improvements in the district, the street now known as Tooley-street may again bear its ancient name of St. Olave-street, which should be extended to the streets now known as Free-school-street and Thornton-street, so that the whole of the improved line of communication which lies within the district, and which, with the parts of Tooley-street not affected by the improvements, runs in a continuous line from London Bridge to Dockhead, may in future be known as St. Olave-street." When the resolution came on for discussion the chairman said it was a very important matter, and he advised the Board not to adopt it without very careful consideration; on which Mr. Sard, the gentleman who had given notice of the motion, said that he had been thinking of the inconvenience that would arise to the large merchants and wharfingers in Tooley-street, who did business all over the world, if it were carried out, and he had come to the conclusion to withdraw the resolution. Tooley-street is saved for the present.

MONUMENT TO THE COUNTESS OF CAEN, PARIS.

The Countess of Caen, who during her lifetime was a great friend of the fine arts, left, at her death in 1872, a large part of her fortune for the foundation of a scholarship in the three branches of art, painting, sculpture, and architecture. The scholarship is confined to those artists to whom the "Grand Prix de Rome" is awarded, and enables them to continue their studies on their return from that city for a further period of three years. The Countess in her will bequeathed an annual pension of 4,000 francs to painters and sculptors and 3,000 francs to architects, the recipients engaging, during the last year, to furnish a work for the museum which will bear her name. This museum will be inaugurated very shortly, and will be established in the right wing of the Mazarin Palace (Institut de France). At the *Salon* last year were exhibited the first three works contributed by the "pensionnaires" towards the decoration of the above museum. The one which more particularly interests us is that of the architect, M. Emile Ulmann, Grand Prix de Rome in the year 1871; "hors concours," 1879. M. Ulmann, as the first recipient in the branch of architecture, conceived the happy idea of a monument to perpetuate the memory of the most worthy and generous Countess. This monument, which will be erected in the museum, is, in a measure, in the Italian Renaissance style, though the composition is original in conception and in conformity with the spirit of the subject. In a recess, reclining upon a cenotaph, her head resting upon one hand, and holding in the other her will, the Countess is dictating her last wishes, which two winged children at her feet are writing down. Above the recess are three niches containing allegorical figures of painting, architecture, and sculpture, with their respective attributes. On either side of the monument are marble tablets on which are engraved those portions of the will referring to the Institution. These tablets are surmounted by the heads of Minerva and Rome. On the base of the monument is engraved the votive inscription crowned by the arms of the Countess of Caen. The entire monument will be of white marble. Our thanks are due to M. Ulmann, the architect, for his kindness in supplying us with every necessary information.

PROPOSED NEW BUILDINGS, NEAR NICE.

St. Margaret's Schools.

These schools, of which we give a view, will accommodate fifty boys and fifty girls, and are provided with two class-rooms to each school, master's residence, offices, &c. There are two large playgrounds at the back, which will be paved with asphalte. A local stone will be used. The cost will be about 9,000*l.* Mr. Braithwaite, of Lichfield, is the donator, and Mr. E. B. Lamb, of Manchester, the architect.

Vestries, etc., St. Margaret's Church.

The facings are to be of local stone, dressed with Caen. The interior of the school and meeting-room will be faced with white glazed bricks, with a grey dado. The floors of the passage to the church and porches are to be paved with tiles. The roofs of the school and meeting-room are principally of English oak, and open-timbered.

The cost of the buildings, including tower, will be about 1,100*l.*

The school is intended mainly for the musical instruction of the choir, seating being provided for about forty.

NEW THEATRE, TIFLIS.

In 1876 the Administration of the Russian province of the Caucasus advertised for designs for a new theatre at Tiflis, in the Caravan-Serai, to take the place of the one destroyed by fire. In accordance with the terms of the competition, the theatre was to be constructed of stone, at a cost of 250,000 silver roubles (37,500*l.*); a premium of 1,500 roubles being offered for the best design, and for the next two in merit 750 roubles each. The style of the building, that is, the outward appearance of the theatre, was left to the option of the competitors; but as regards its interior, and especially of the auditorium, it was to be decidedly in an Eastern style, Arabian, or Persian. Moreover, the new theatre was to be as nearly as possible like the old one. At the time appointed, four designs were sent in to the committee specially appointed; the devices being respectively "Nie V'perviye" (Not for the first time), "Sphinx," and "Popuitka" (a Trial), the fourth being marked only with initials. The first one named was deemed the best, the successful competitor being the architect Schreter, an Academician. The designs with the devices "Sphinx" (architect Simonsen), and "Popuitka" (Princes Toumanoff and Liavdansky, captains of Engineers), received the second and third prizes of 750 roubles each. The design of B. A. Schreter, which satisfied all the requirements of the competition programme, is distinguished by the convenient arrangement of the interior of the theatre. The building is lighted by gas, and warmed with hot air.

A PROJECTED MONUMENT IN JERSEY.

A movement is on foot for the erection of a statue of Major Peirson, in the Royal-square, St. Helier's, Jersey. That gallant officer, who led the British forces to victory during the French invasion of 1781, and who met with a soldier's death at the supreme moment of victory, is represented standing upright, in a martial costume, and in an observant but hopeful attitude. The model has been taken (from the best engraving extant) by Mr. H. W. Sohier, a clever local sculptor, whose chief works,—busts of Dr. Jeune, late Bishop of Peterborough, Major Peirson, and Advocate Le Sueur,—adorn the town-hall. His latest work is a bust of Swedenborg, presenting a striking likeness. The projected statue will be in marble.

Art-Gallery for Birmingham. — At a meeting in Birmingham on Thursday, about 3,000*l.* were subscribed towards 5,000*l.* required to secure an additional 5,000*l.* conditionally promised by Messrs. Tangye for contributions to the Art-Gallery. The Mayor, who presided, headed the subscription-list with 500*l.*

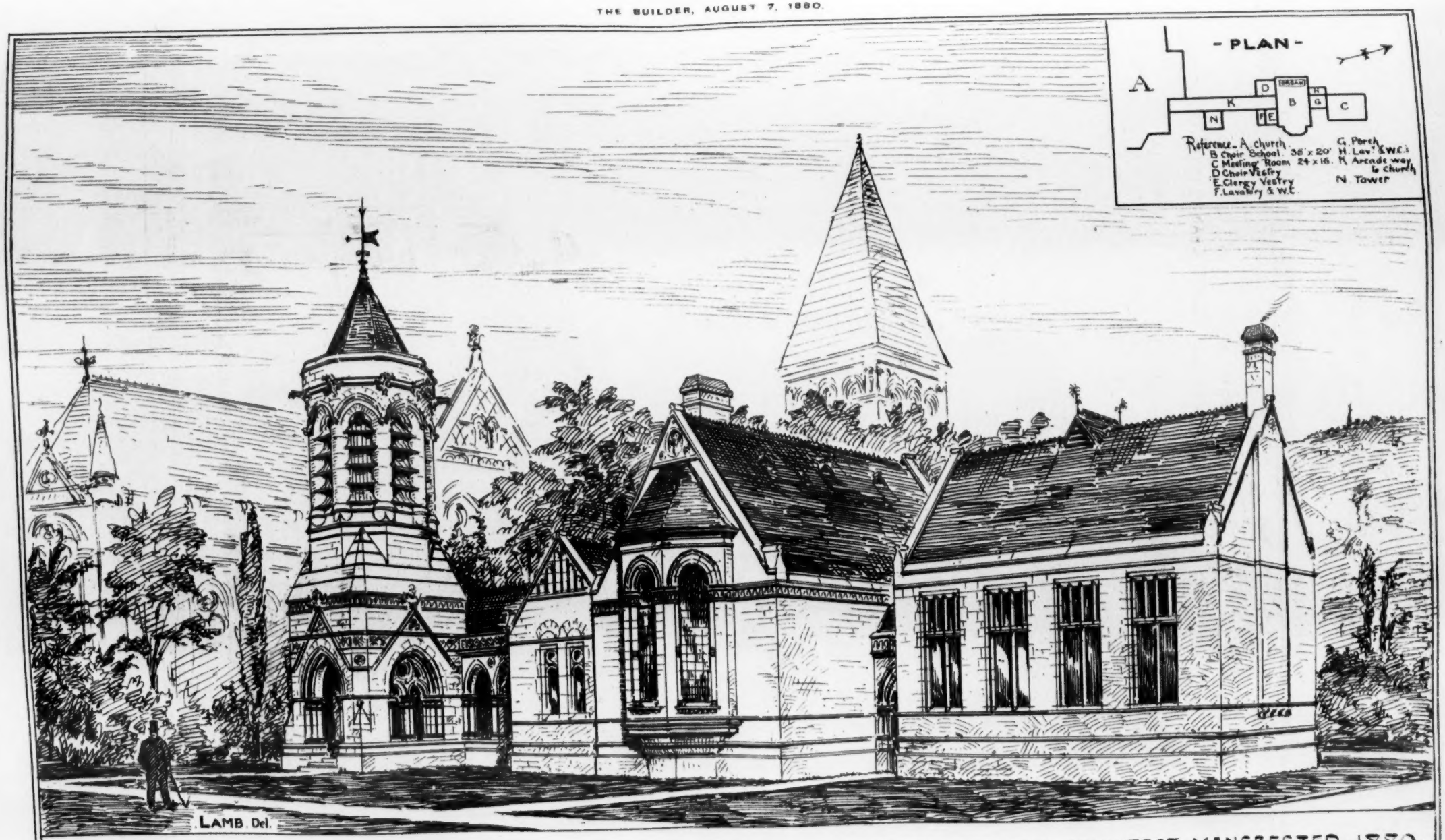
PROPOSED MONUMENT TO THE COUNTESS OF CAEN.—Designed by M. Ulmann, Architect.

PROPOSED NEW SCHOOLS NICE.

E. B. LAMB, ARCHITECT - 54 EXCHANGE ARCADE CHAMBERS, MANCHESTER.

Whiteman & Bass *Photo Litho* 236, High Holborn

Wyman & Sons, Printers, 0 Queen St



· ST·MARGARET'S CHURCH·NICE·N.E.VIEW·SHEWING·CHOIR·SCHOOL·VESTRIES·&c·E·B·LAMB·ARCHITECT·MANCHESTER·1880·

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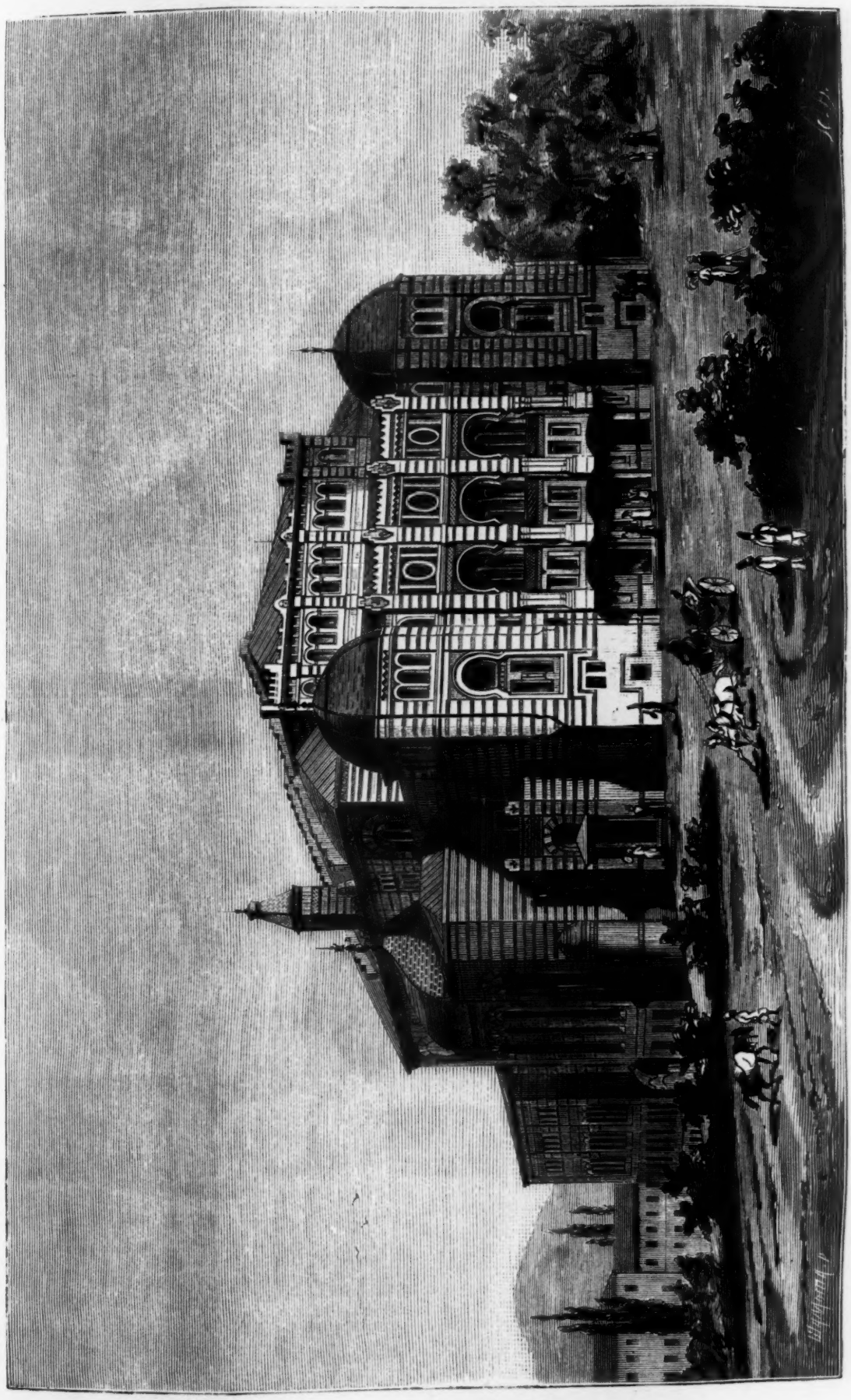
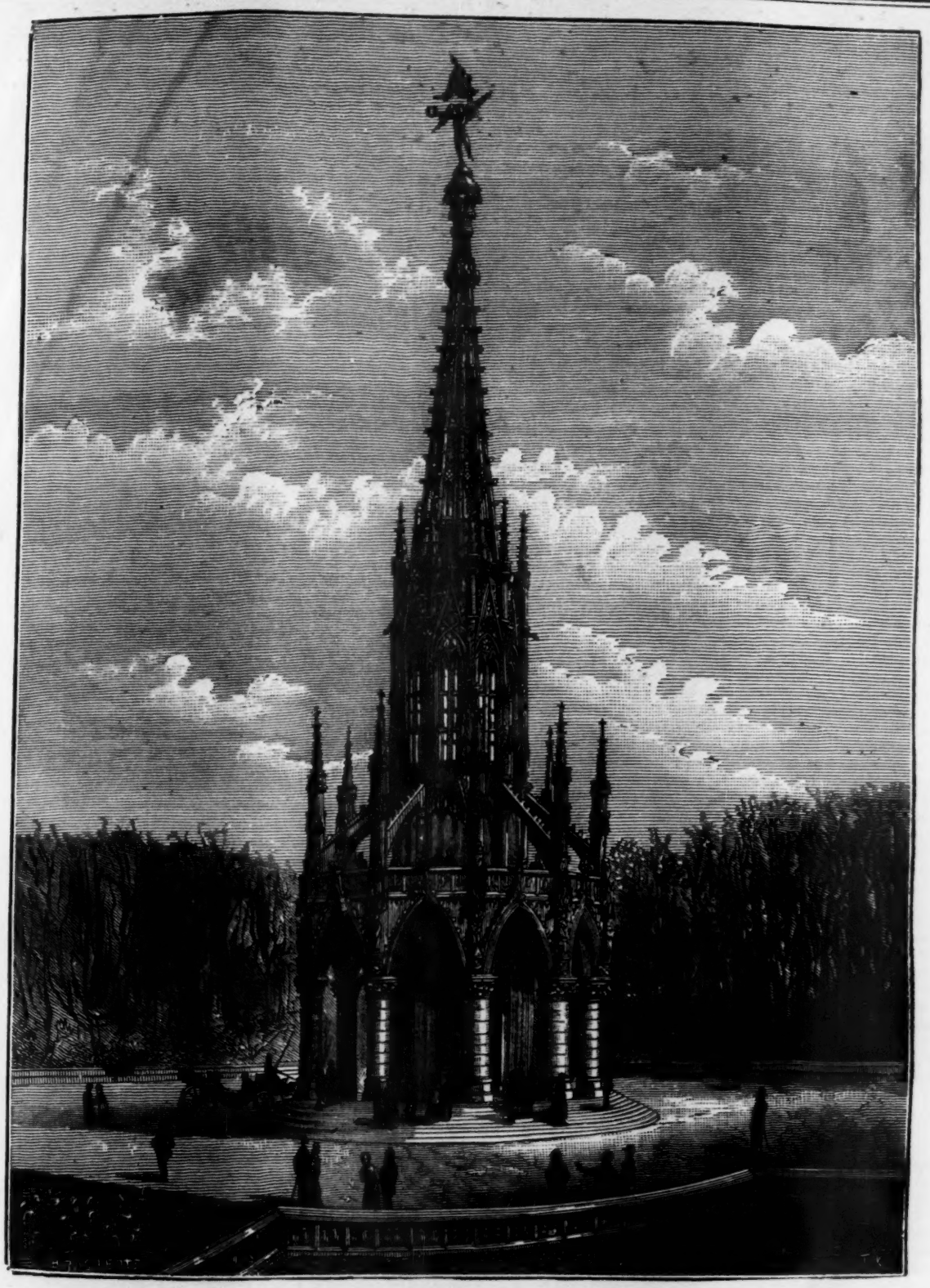


THE NEW THEATRE AT TIFLIS.— B. L. Schreter, Architect.



MEMORIAL OF KING LEOPOLD I. OF BELGIUM, IN LAEKEN PARK.——M. L. de Curte, Architect.

EXETER HALL, STRAND.

The Committee of the Young Men's Christian Association having purchased the Crown lease of this property, invited competition designs from three architects for the proposed alterations.

The plans prepared by Mr. Alfred R. Pite, of Bloomsbury-square, being unanimously approved, the committee have authorised the works to be carried out as speedily as possible, that the public may have possession of the Hall early in 1881.

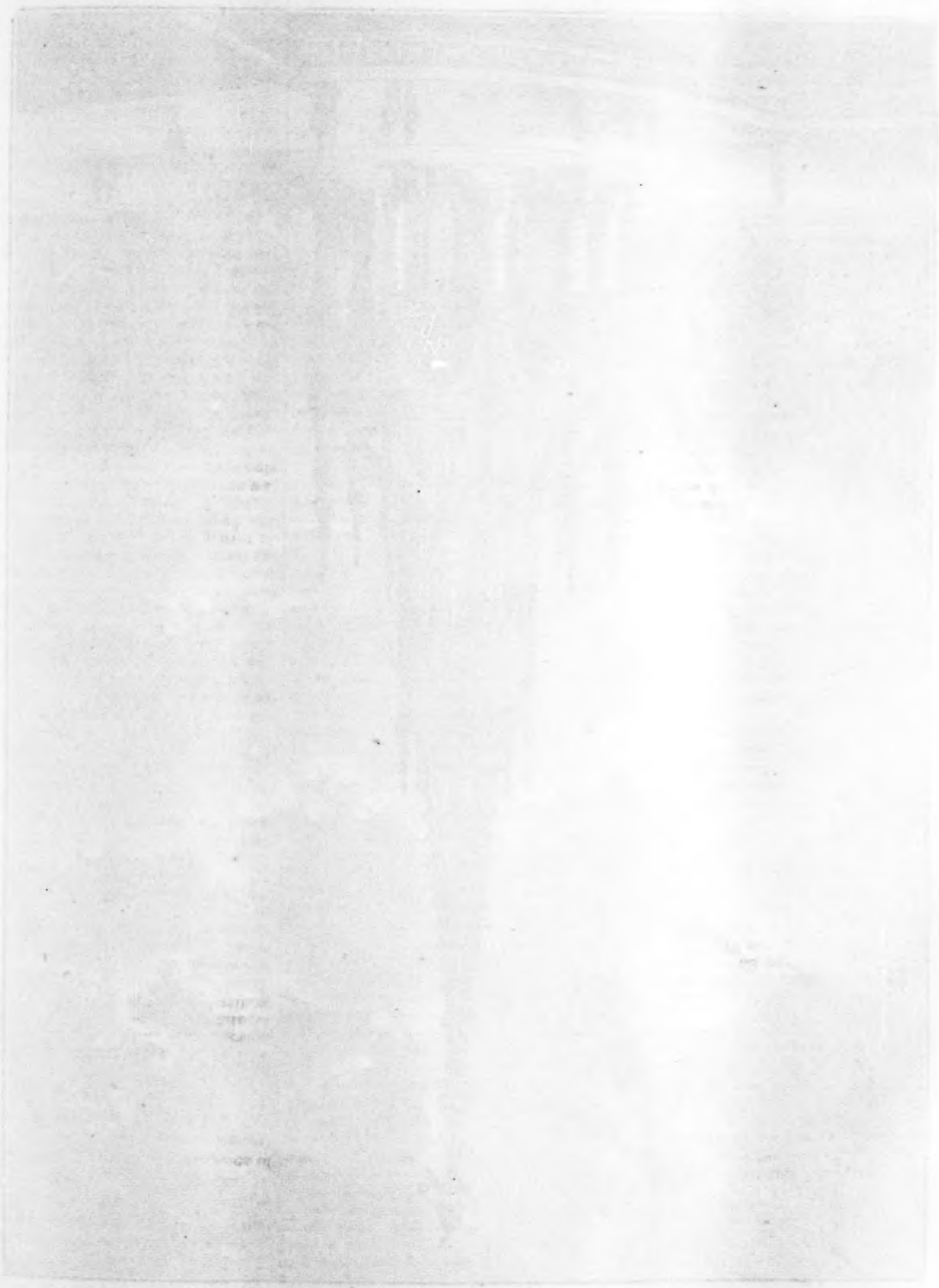
The additions proposed are of an extensive character, the whole of the ground-floor being appropriated to the work of the Association, having spacious reception-rooms and assembly-hall. The mezzanine floor is retained for offices. The large hall is to be considerably improved, and provided with additional staircases for egress and access.

MEMORIAL OF KING LEOPOLD I. OF BELGIUM.

We mentioned, in a recent number, the inauguration of the monument which has been erected to the memory of the first king of Belgium, in the Park at Laeken, Brussels, and we now give a view of it. Like the memorial of the Prince Consort in Hyde Park, it originated in a public subscription, the amount of which was supplemented by a vote of the Legislature,—in this case, 2,000,000 francs, or 80,000*l*.

The monument is placed on an elevation, from which the visitor has a fine view, not merely of the capital, but of the suburbs. It presents a polygon of nine sides, in remembrance of the nine provinces forming the kingdom, and of these it includes allegorical statues. In the central enclosed space is a statue of the king in white marble. The upper part of the monument consists of an open-work spire, about [illegible] in height. A terminal statue represents the genius of Belgium holding with one hand the national flag, and in the other a civic crown. It is designed in the style of the fourteenth century, and the architect was M. L. de Curte, who has increased by it his reputation.

Production in England.—From a recent book, "The Progress of the World" (Stanford), it appears that in manufactures England at present stands pre-eminent. Its operatives number 2,930,000 against 2,781,000 of Germany, and 1,936,000 of France, and 1,150,000 of Russia. The production per operative is given as—United Kingdom, 224*l*.; France, 220*l*.; Germany, 103*l*. In the principal textile manufactures,—cotton and wool,—the United Kingdom produces a total of the value of 155,000,000*l*.; the United States, 84,000,000*l*.; France, 68,000,000*l*.; Germany, 48,000,000*l*.



ENGINEERING IN THE UNITED STATES.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

On the last annual convention of this Society, the President being unable to deliver the annual address in consequence of his journey to Europe, it was, at his request, prepared by Mr. O. Chanute, Vice-President, with the assistance of members of the Society. It is a very interesting and valuable review of the subject. We give some portions of it:—

We seldom realise how very young is our profession. From the earliest historical periods, until within about 200 years, construction, practically, was in the hands of architects. They built pyramids, temples, roads, fortifications, and such weak machines as they could work by hand, but it is only in modern times that a special body of men has devoted itself exclusively to the building of works and machines for utilitarian purposes,—to the emancipation from toil of the "hewer of wood and the drawer of water."

So recently as 200 years ago, when the English people began the works which have made them one of the great nations of the earth, there was such a lack of trained constructors in the country that they were compelled to send to Holland for what were then called "hydraulic architects," to direct the reclaiming of their marshes and to inaugurate their canals. Soon, however, they excelled their early teachers, and trained the very able engineers who established the modern profession, and whose labours led to the invention of the steam-engine scarcely a century ago. We, who cannot remember the time when steam-engines were not in common use, can scarcely realise that their introduction was so recent; and yet it was only in 1778 that James Watt, after struggling for over twenty years to remedy the imperfections of such machines (as invented by others), finally triumphed over all the mechanical difficulties he encountered, and began the regular manufacture of steam-engines. By this step an enormous impetus was given to development and invention. Not only did the engineer find himself possessed of an instrument which increased many-fold the productive powers of labour, but the use of steam, and the wonders it accomplished, turned men's thoughts to the advantages of machinery and labour-saving appliances. Invention followed invention in every field of mechanics, fresh discoveries of natural laws took place, which were quickly applied by the engineer, and he has been able to accomplish more in the past 100 years than had been achieved in the previous ten centuries. It is my purpose to-night cursorily to pass in review what has been done in this direction in this country. In doing this, I shall touch upon some fields which are as yet scarcely recognised here as within the province of the engineer, but which are falling into his hands in other countries, and probably will in this. I think that you will agree with me, that starting as an independent nation about a century ago, with a population of some 3,000,000 thinly scattered, and with next to no capital, the modern inventions which we have appropriated or made have enabled us to accomplish very remarkable results.

Water Works.—The first works in America for the supply of water to towns were constructed by Hans Christopher Christiansen, and put in operation on June 20th, 1754, at the Moravian settlement of Bethlehem, in Pennsylvania. The water from a spring, which is still used for the supply, was forced by a pump of lignum-vitæ of 5 in. bore, through hemlock logs into a wooden reservoir. The same ingenious Dane, eight years later, replaced this rude pump by three iron pumps of 4 in. bore and 18 in. stroke, which for many years were the only machinery for water-supply on the continent, and for seventy years furnished the water for Bethlehem. Among the oldest, if not the very next in date to Bethlehem, is the Morristown, N.J., Water Company, which was incorporated in 1791, and has ever since furnished the town with water collected from the neighbouring hills. The first application of steam to pumping was in Philadelphia, in 1800, when the third steam-engine of any considerable size in the United States was erected on the banks of the Schuylkill. It is believed that these works were the first constructed by a municipality. The first cast-iron water-pipes were laid in Philadelphia in 1804. New York was first supplied by a company which erected a small pumping-engine about 1800. About 1850 the substitution of light wrought-iron pipe, lined inside and out with hydraulic cement, for cast iron, at greatly reduced cost, was found to be practicable in many cases, and the formation of companies to manufacture and lay such pipes introduced a commercial element into the matter of water-supply, and led to the construction of many works. All American works are constructed for a constant supply, and most of those first built had a capacity far in excess of the then demand, which caused the formation of habits of wastefulness, which it has been found difficult to check when the limit of the capacity was nearly reached. The magnitude of the interests involved in this branch of engineering may be judged from the fact that there are now in the United States and Canada 569 towns with a public water-supply, having a population of about twelve millions, to whom there are daily distributed over 600 millions of gallons of water, through 13,000 miles of pipes, of which about 10,000 miles are of cast iron. About one-half of these towns are supplied by gravity, many of them, however, having supplemental pumping power,—the total capacity of the pumping engine now in use being about 1,900 millions of gallons per day. Meanwhile improvements in plumbing and house distribution have greatly added to the convenience about our homes, and we now virtually have a spring of cold and another of hot water in almost every room of our city houses, to put on tap at will.

Hydraulics.—The attention of manufacturers was drawn at an early day to the development of the water power of the streams on the Atlantic coast. With the aid of capitalists, who appreciated the value of an investment in experimental researches, some of the most effective efforts towards the solution of problems in practical hydraulics have been made by American engineers, on a scale unattempted in Europe. The early foreign experiments, on which most of the formulæ for the discharge of water from weirs, orifices, and pipes are based, were on too small a scale to furnish data capable of generalisation for greater discharges.

The experiments of Mr. Jas. B. Francis, at Lowell, have, among other valuable results, established correct values for the co-efficient of discharge of weirs, and his formula is now generally used. The researches which have been made at Holyoke and Lawrence have done much to settle disputed points in relation to the movement and effect of water in channels, and the systematic experiments now in progress, on the new conduit of the Boston Water Works, cannot fail to be of the greatest value in determining the co-efficients of flow in masonry channels. The laws governing the flow of water in pipes, are still too little understood. It is a reproach to American engineers that so little effort is made to discover them, notwithstanding the opportunities presented by the pipe systems of our water-works, sewage systems, and hydraulic mining conduits. . . .

Railways.—Quick to appreciate the consequences of the invention of the locomotive, or rather its marvellous improvement by Stephenson in 1829, and the peculiar adaptability of the railroad to our country, as a means of settling up new lands and of cheapening the interchange of products, we began building railways very soon after the English, and have pushed their construction with unexampled vigour. . . .

Since 1875, some 10,268 miles have been built in Europe, and about 5,000 miles in other parts of the world, outside of the United States, chiefly in Australia and India, so that the world's railways probably stand to-day as follows:—

Europe	98,375 miles, or	47	per cent.
United States	86,121 ,,	41	,,
Rest of the world	25,000 ,,	12	,,
	209,396		

Thus our fifty millions of inhabitants have furnished themselves with 86,000 miles of railway, while the 306 millions of Europe have 98,000 miles, and the 1,050 millions of the rest of the world possess but 25,000 miles. There were in Great Britain on the 1st of January, 1879, 17,333 miles of railway, on which there were about 32,000 miles of track, 12,969 locomotives, 418,322 passenger and freight cars, owned by the companies, in addition to some owned by private parties, and over which trains ran 222,376,114 miles, and conveyed 565,000,000 passengers. The capital account of the English roads was 698,545,154 pounds sterling, or $3,380,958,545, thus giving an average cost of $195,059 per mile of road. The average cost per mile in several other countries about the year 1875, was as follows:—

France	1873	$163,500
Belgium	1873	111,342
Germany	1875	100,570
Austria-Hungary	1875	105,847
All Europe	1875	120,960
United States	1879	58,915

Thus our railroads have cost less than half as much per mile as those of Europe. Going back one year, for purposes of comparison, on the 1st day of January, 1879, we had in the United States, 81,841 miles of railroad, on which there were 101,660 miles of track, or enough to encircle the globe three times and a half. There ran upon these roads 16,445 locomotives, 11,683 passenger cars, 4,413 baggage, mail, and express cars, and 423,013 freight cars. The capital invested was $4,772,297,349, or $58,915 per mile of railroad; the gross earnings were $490,103,351, or $6,209·52 per mile; the working expenses were 61·79 per cent. of earnings, or $302,528,184, —say $3,887·10 per mile of railroad; and the net earnings were $187,575,167,—say $2,322·42 per mile, or 3·932 per cent. on the nominal capital. While the greater cheapness of our American railroads is in some measure due to the comparative smoothness of much of our country, and to the absence of heavy land damages, much more is due to the methods of construction applied to the railroads themselves, to the cheap and efficient expedients which our engineers have introduced, and especially to the character of the rolling stock which we have adopted. . . . . Although our railroads were originally cheaply and imperfectly built, and although we pay in this country a great deal more for labour and material than the prices which obtain in Europe, we have nevertheless reduced the cost of transportation to as low figures, if not lower, than any which obtain on the other side of the ocean. The grindstone of competition between the railroads themselves, and with canal, river, and lake routes, has reduced freight transportation to such a fine point that our railroad managers have devised new and cheaper methods of doing their work, have learned to operate their roads with a smaller proportion of men, and have accomplished results which astonished even themselves. Sharp competition and the incessant demands of the public have for the past few years diminished rates so rapidly that, as a whole, our railroads are now paying smaller returns upon the entire capital invested in them than those of most foreign countries, and the people of the United States have since 1873 had their property transported for less than it was reasonably worth. It has been shown in giving the net earnings of all our railroads, that for the year ending January 1, 1879, they earned 3·93 per cent. upon the total capital invested in them, while the railroads of Europe in 1875 earned the following returns upon their capital:—

Great Britain	4·4 per cent.
France	5·1 ,,
Germany	5·1 ,,
Austria-Hungary	3·9 ,,
Russia	4·0 ,,
All Europe	4·3 ,,

As Americans, we have no reason to be dissatisfied with the results accomplished thus far. We have succeeded in so organising labour that while we pay it from 30 to 50 per cent. more than in Europe, we build our railways for about one half the cost, and we transport freight over them with the aid of our machinery, at materially cheaper rates than those which obtain in other parts of the world. Not only should engineers endeavour still further to improve and to cheapen the construction, and especially the operation, of our railroads, but they should now find in foreign countries, as yet unprovided with them, fields in which they can introduce the features of economy which we have developed. At home we shall doubtless continue to build new lines in the same cheap light style which we have made so efficient, and we shall largely extend the narrow gauge in sparsely-settled districts. We should, however, so locate our roads as to secure the best possible line and gradients, even if, after they are adopted, we do not bring the embankments to the full heights, in order to save present expense. As population and traffic increase, we can, if the works are well planned for that purpose, rebuild, add to, and improve them, so as to diminish the cost of transportation to the best economy. . . . The day cannot now be far distant when the merits and economy of the American type of bridges will be recognised by other nations. Already, notwithstanding the fact that labour and materials are cheaper in other countries than in

this, we are enabled to compete successfully in Canada and in South America. I believe that a well-directed effort to make known abroad what we have accomplished in this branch of engineering during the last fifteen years would open a market for our bridges and bridge designs in Europe and in Asia.

Lighthouses.—From the report of the Lighthouse Board for the year ending June 30, 1879, it appears that the Government has erected the following lighthouses:—

First order	47
Second ,,	26
Third ,,	55
Third and a-half order	10
Fourth ,,	200
Fifth ,,	123
Sixth ,,	165
	626
River Lights,—Mississippi, Ohio and Missouri Rivers	737
Buoys in position	3,114
Fog-signals,—steam or air	56
Light ships	31

As a measure of comparison, it may be interesting to note that on the 31st of December, 1878, England reported 597 lighthouses, and France 346 lighthouses. . . .

Telegraphic Engineering.—The lines of telegraph are being extended so rapidly that it is difficult, even for their owners, to state the aggregate quantities at any particular time. The best information, however, which can be obtained is that on the 1st of January of this year, there were 119,042 miles of telegraph-lines in the United States, and 299,859 miles of wire, without counting those lines specially used by the Gold and Stock Telegraph, and the District, the Fire Alarm and Burglar Alarm Telegraphs in the various cities. One telegraph company alone, the "Western Union," had in June, 1879, 8,534 offices, from which were sent and received 25,070,106 messages during the preceding year. Equally prompt has been the application of the telephone, which, looked upon doubtfully, or only as a toy, when it was first shown by Professor Bell at our Centennial Exhibition four years ago, has so rapidly become a necessity, that there are now in this country 121,000 instruments at work, connecting our business places and dwellings with each other, and with the central offices, by means of which we are almost instantly brought within speaking distance of the persons, miles away, with whom we have to transact our business. . . . .

Iron and Steel.—We are now the second iron-producing nation in the world, England being the first and Germany the third, while 44 new furnaces are reported as being built. We have in addition 382 rolling-mills and steel works, containing an equivalent of 4,467 single puddling furnaces, 2,419 heating furnaces, and 1,397 trains of rolls, with a capacity of 4 millions of tons a year in finished iron. Seventy-three of the rolling-mills have nail factories attached, with 4,152 nail-machines, and to make the list complete, we may add that there are in addition 69 forges, with a capacity of 85,000 tons a year, and 59 bloomaries, with a capacity of 80,000 tons a year. Mr. Swank says: "Our steel industry is now the second in the world in productive capacity, and in a year it will pass that of Great Britain, and take the first rank. The increase in the past year in the capacity of our Bessemer and open hearth works, either completed or projected, is equal to an addition of 50 per cent. to the capacity which existed in 1878."

The Engineering Future.—Although during the past few years there has been a depression in the progress and undertaking of new enterprises, and a diminished demand for engineers, I do not believe that we are at the end of the great industrial movement which began with the steam engine. I think rather that we stand on the threshold of greater undertakings, and, perhaps, of inventions, which will mark epochs in civilisation, and which, whether made here or in some other country, our engineers should be prompt to take up, to perfect, and to introduce. There are signs that a new motive power will be invented, which shall be safer, of greater energy, and less wasteful than steam. You know that chemists tell us that the theoretical energy of a pound of coal varies between 8 and 11 millions of feet pounds, while we utilise with our best steam-engines but from 3 to 11 per cent. of the theoretical value of the fuel. I think it not impossible that we shall perfect methods of employing directly the gases produced from our fuels (instead of using them to generate another gas out of water), and thus obtain better economical results than with steam. I know of several promising attempts in this direction. And, with a new motive power, perhaps will come the solution of the last transportation problem which remains to be solved. I suppose you will smile, when I say that the atmosphere yet remains to be conquered; but wildly improbable as my remarks may now seem, there may be engineers in this room who will yet see men safely sailing through the air. In making this review, I have gone over rather a wide field, and touched upon topics which some of you, perhaps, may consider as foreign to our profession. I have, however, but followed the European practice, and that especially of our early professional teachers, the English, who, mindful of the original distinction between the civil and military branch, recognise all makers of marine, telegraph, gas, mining, and agricultural engines, as civil engineers. In this country we have taken hitherto a somewhat narrower view of the province of the engineer. We think of him mainly as a builder of water-works, canals, railways and bridges, and we underrate his importance as a builder and applier of machines. In point of fact, the most important services which the world has received from our profession have been rendered by the mechanical engineers. The men who have reduced the cost of iron and steel to less than half the prices which obtained half a century ago, who perfected the steam-engine, who set it to drawing carriages over the land, and driving great ships through the sea, and who harnessed lightning to convey thought, are the men who have made the present development possible, and enabled us to build the public works of the country. In Europe, the civil engineer is required to be much more than a mere designer and layer out of public works. Not only must he thoroughly understand the application of machinery, and be able to devise new methods, if necessary, but he is expected to be a business man, to act as an originator and promoter of new enterprises, as a director or superintendent of public improvements, and as an organiser of labour. It is probably in consequence of that broader understanding of the field open to them, as well as the better organisation of their professional societies, that the civil engineers have attained a higher position abroad than they have, as yet, in this country, and have attracted into their ranks the most enterprising and gifted men, who remain permanently in the profession; while with us, engineers cease to be regarded as such by the public when they achieve success, and become presidents or superintendents of public enterprises. In France, the direction of almost all departments of public works is in the hands of engineers, and two of them are members of the present ministry. In England, so great is the confidence that the public have in engineers, that they are constantly called upon to appear before committees of Parliament, thus coming into contact with the ablest men in the kingdom, to advise them concerning the merits of various propositions; and no new scheme stands much chance of success unless it is approved by the leading members of the British Institution of Civil Engineers, which includes within its list, not only the names of all the eminent men in the profession, but also those of princes, kings, and an emperor.

THE PROPOSED THEATRE IN BEAUFORT BUILDINGS.

Changes in the arrangements have been made. On Tuesday last Messrs. Stuart Barker & Son disposed of the materials of the buildings which are to be cleared away on the site of the intended structure. They consist of five private houses on the west side of Beaufort-buildings, two houses in Herbert's-passage, on the north side, and several workshops and warehouses in Carting-lane, which will form the extreme west boundary of the new theatre. The site thus to be cleared covers an area of something like 10,000 superficial feet, which will represent the capacity of the theatre. The new building will have four distinct frontages, namely, in Beaufort-buildings and Carting-lane, on the east and west, of about 150 ft. in length, on the north side in Herbert's-passage, about 80 ft. in length, and a fourth frontage on the south side, in which, it may be observed, will be the principal entrance to the boxes and some other parts of the house. The steep gradient from the Strand into Beaufort-buildings renders a carriage approach there inconvenient, and Mr. Phipps, the architect appointed, has so arranged his designs that the approach to the theatre for setting down visitors will be from the Thames Embankment into Savoy-place, arriving at the entrance to the theatre on the south side under an archway contiguous to Beaufort House, the business premises of Messrs. Rimmell. In addition to the principal entrance on the south side, Carting-lane, on the west side, will also admit of other entrances from the Strand. Although the chief entrance will be as before stated, we understand that the principal elevation will be in Beaufort-buildings. It is expected that the new house will be completed and ready for opening about the end of the year.

THE NEW POST OFFICE SAVINGS-BANK.

The new building which has been erected for the Savings Bank department of the General Post Office in Queen Victoria-street has been opened for business. The building adjoins (and dwarfs) the British and Foreign Bible Society's new building, and extends northwards to Knightrider-street. The elevation is in Portland stone, the ground and first floors being rusticated. Each floor above the ground-floor contains a range of eleven windows. There are five floors and a basement. Over the two entrances, one at the west end, the other at the east end, there are bold cornices, supported on carved brackets, and the whole elevation is crowned by a massive cornice, with a parapet at the edge of the flat roof, each end of the cornice terminating with a scroll, in which, on the face of the building, is carved a lion's head of large size. The whole height above the pavement level nearly 96 ft., and the length of the frontage nearly 148 ft., but the other side of the building in Knightrider-street, which is of Suffolk bricks, with stone dressings, is only about 86 ft., owing to the intrusion of some separate premises at the west. There is an inner shaft measuring 45 ft by 30 ft., lined throughout with white enamelled bricks, which runs up the whole height of the building. The building has an average depth of about 100 ft., and covers a ground area of nearly 15,000 superficial feet. All the floors rest on iron girders and columns, the construction being, as far as possible, on the fire-proof principle. The ceilings throughout are 16 ft. high, except in the basement, where the height is 12 ft. The public entrance is at the west end, in Queen Victoria-street, and over the doorway are inscribed, in letters of gold on a black ground, the words "Post Office Savings Bank," embellished on either side by the Royal monogram "V. R." On entering by the public doorway the principal staircase is on the left, and at the right is the public inquiry office, beyond which, comprising the rest of the groundfloor front, is a spacious apartment devoted to general correspondence, together with the rooms of the Controller and the Assistant-Controller. Behind is a large room appropriated to what is called the deposit section, where acknowledgments for all deposits made to the 6,120 post-office savings-banks throughout the United Kingdom are written from the postmasters' daily accounts. The first floor is appropriated partly to the rest of the correspondence branch and partly to the bookkeepers' branch, and the latter also occupies the whole of the second floor. In this branch are the ledgers, about 3,560 in number, containing more than two millions of depositors' current accounts, in which every deposit and withdrawal is duly entered. The third floor is divided into two parts, one being assigned to the male staff of the examiners' branch, and the other to a portion of the minor establishment employed in sorting duties, which include the folding and despatching of correspondence, the daily number of communications so dealt with having sometimes been above 40,000. The fourth floor is appropriated exclusively to the staff of female clerks, whose duties are chiefly the examining of warrants for the repayments of deposits, the checking of the postmasters' accounts, and the compiling of documents to prove the totals of daily and quarterly transactions. Dining-room, kitchen, cloak-room, and lavatories are here provided for the special use of the female clerks. By the use of the entrance from Knightrider-street and a staircase connected therewith the female staff will be separated from the rest of the establishment. The basement extends throughout the entire area of the edifice, and is used chiefly for the storage of papers.

The Treasury sanctioned the erection of the

building in 1877, at an estimated cost of 40,000*l.* (revised estimate, 43,000*l.*), the cost of the site being 70,000*l.* The building has been erected from the designs and under the superintendence of Mr. James Williams, of her Majesty's Office of Works and Public Buildings; Mr. William Brass being the contractor.

SCHEME OF PROFESSIONAL EDUCATION PREPARED BY THE INSTITUTION OF SURVEYORS.

An Examination System, which will take effect from the 31st of July, 1880, has been established by the Council of the Institution of Surveyors to meet the requirements of professional education.

The Examinations will be classified under three heads, viz.:—

Class I.—Students' Preliminary Examination.

Class II.—Students' Proficiency Examination.

Class III.—Professional Associates' Qualifying Examination.

The Examinations in Classes I. and II. will be compulsory.

Class II. will be divided into the three sub-classes shown in Table A.

The Examination in Class III. will be voluntary, and is designed to give Professional Associates an opportunity, subject to conditions hereinafter stated, of qualifying themselves to be Members of the Institution.

As regards the "Students' Preliminary Examination," any person eligible under the existing bye-laws, being desirous of becoming a Student of the Institution, will be required to undergo a preliminary examination, with the view of testing his general knowledge and educational acquirements.* The subjects of examination will be as follow:—

Elements of algebra, including simple equations.

Euclid,—the first three books.

English history.

Composition and writing from dictation.

Some acquaintance with either Latin, French, or German will also be required.

Those successful in passing the examination will receive a certificate to that effect, and will be enrolled as students of the Institution. The examination will be held in the month of January in each year. Applicants shall send in their names to the secretary before the end of the preceding month of November. The pupil passing with the highest number of marks will be exempted from the payment of fees during the term of his studentship.

(free of charge) of acquiring practical experience, for a period not exceeding twelve months, in a London office.

A Medal will be given to any student obtaining 900 marks in any of the sub-classes."

Printed particulars as to the examinations are obtainable.

Table A.—Class II.—Students' Proficiency Examination.

Sub-Class I.—Chiefly Land Agency.	Sub-Class II.—Chiefly Valuation.	Sub-Class III.—Chiefly Building.
Compulsory Subjects.	*Compulsory Subjects.*	*Compulsory Subjects.*
Bookkeeping.	Bookkeeping.	Bookkeeping.
Principles and Use of Valuation Tables.	Principles and Use of Valuation Tables.	Principles and Use of Valuation Tables.
Land Surveying and Levelling.	Land Surveying and Levelling.	Land Surveying and Levelling.
Law of Landlord and Tenant (Elements of).	Law of Landlord and Tenant (Elements of).	Modes of Pricing Work.
Agriculture.	Enfranchisement of Copyholds.	Estimation of Quantities and Measurement of Artificers' Work.
Construction of Farm Buildings.	Law of Fixtures,	Constructive and Working Drawings.
Forestry.	Law of Dilapidations,	Law of Fixtures,
Land Drainage.	Agricultural Law, } Elements of.	Law of Dilapidations, } Elements of.
Geology and Composition of Soils.	Law of Easements and Riparian Rights,	Law of Easements, Light, and Air,
A Report on some Special Subject named by the Council will be required of Students passing in Sub-Classes I. and II.		

SCIENTIFIC AND SPECIAL.

(Two at least of these Subjects must be taken in Each of the Three Sub-Classes.)

Algebra.	Metallurgy (Physical Properties of Metals).	Composition and Properties of Stones and Cements.
Botany.	Agricultural Chemistry.	Road-making.
Natural History.	Mineralogy (Form and Physical Properties).	Metropolitan Buildings Acts.
Trigonometry.	Mechanics (Law of Forces).	Principles of Parochial Assessment.
Hydrostatics (Elements of).		
Meteorology (Principles of).		

Various prizes are open to students. For example:—

"To signalise conspicuous merit, a Medal and the title of 'Institution Scholar' will be given to the student who obtains the greatest number of marks, over 900, of any of the students examined in Sub-classes I., II., and III.; and the name of the student so distinguished will be permanently recorded on the walls of the lecture-hall.

The members of the Council will give the candidate who succeeds in earning the distinction of 'Institution Scholar' an opportunity

* Persons producing a certificate of having passed the matriculation examination of the University of Oxford, Cambridge, London, or any other university in the United Kingdom, or who have passed with honours the senior local examination of the University of Oxford or Cambridge, will be exempted from this examination.

PITCH-PINE, RED PINE, AND YELLOW PINE.

With reference to "An Architect's" query in your last (page 157), a proper knowledge of the qualities of various sorts of wood is one thing; it is, however, equally important to know how wood will endure under use in various forms. Some wood will last longest when preserved dry, other sorts of wood when wet; but in both cases it must be all dry or all wet. Other samples of wood will have a tolerably long life when exposed to alternate wet and dry; whilst such form of exposure tends to rapid decay with other wood. There is one test to which pitch-pine, red pine, and yellow pine, when put, that settles the question in favour of the softer wood,—namely, the deck of a steamboat. As to this, I can vouch for results by experiments on a considerable scale. I had charge of an inland navigation some years ago, where there were thirteen steamboats and numerous canal boats employed. Pitch-pine and red pine had been used for decks for many years, when one of the foremen suggested that yellow pine would last longer than either of the more costly and harder woods, especially over the steamboats' boilers. The experiment was made, with the result that afterwards yellow pine was selected and used exclusively for decks. American elm, used as planking for canal flats entirely below the water-line, would wear, as one of the men said, "like whalebone"; but "betwixt wind and water" would rapidly decay. Pitch-pine and red pine cannot be seasoned to stand for house-furnishing as wainscot oak stands, as may be seen when it is used for inside woodwork, as in architraves, skirtings, door-frames, and doors to be varnished. Fine white and yellow pine are therefore used for internal joiner's woodwork, and not having the ornamental appearance and hardness of the red woods, are painted.

"An Architect" has arrived, by experience, at a correct conclusion, namely, that yellow deal cills will last longer than either red or pitch pine cills. But would not well-seasoned English oak, or teak, make better, because more enduring, cills? They would cost more. But how much?

Scamping timber in quality and in scantling is one of the evils of modern country house-building, and I do not know a greater risk than purchasing a new house run up in the suburbs of some town, or in the country where building regulations are not in force, or are not enforced. Take a house, priced at 1,000*l.*, and reason thus:—25*l.* saved by scamping the timber may make such a house comparatively valueless, where 25*l.* additional, or 50*l.* extra, would have paid for the best quality of timber, of full scantling, with well-seasoned oak cills throughout. The scamped house is a cripple to begin with, and, like cripples of all sorts, is an unceasing trouble and care, with no chance nor hope of cure. The house built with well-selected material will be sound and enduring for years, saving the extra cost many times over,—we will say, first, in temper; and then, by not needing repairs. Mr. Briggs has told us, in *Punch*, what are the costs and miseries attendant on scampingly-built houses, and subsequent repairs.

Yellow pine will be found to stand and wear better in street paving than any of the harder samples of wood; for which I could give reasons. I will only say that the best sample of wood paving I have seen, or driven over, is that portion near to South Kensington Museum, which is yellow pine, set on felt, and jointed with felt, the foundation being Portland cement concrete. This paving is smooth, close-jointed, and firm; free from mud in wet weather, and from dust in dry weather. By being laid close, with a jointing of felt, the surface is water-tight, and looks like one smooth sheet, as if on asphalte. This must be the street paving of the future.

A Civil Engineer.

SALE OF A CITY FREEHOLD.

Last week Messrs. Fox & Bousfield sold, at the Auction Mart, the modern freehold buildings recently erected in St. Dunstan's Passage, Great Tower-street, facing St. Dunstan's Church. It was stated that the buildings were specially constructed for office purposes, and had an ornamental elevation, in which carved and moulded stone was freely introduced. The building contains four spacious floors, the groundfloor consisting of a well-lighted public office, extending the entire depth of the building. The basement was stated to be substantially fitted with strong rooms. The property covers an area of 1,167 superficial feet. Mr. Bousfield, who conducted the sale, alluded to the great value of the property, as being situated in the very centre of the colonial produce, and import markets, adding that in view of the contemplated improvements in this part of the City, and the eventual carrying out of the Inner Circle Railway completion (which would intersect the property), it was difficult to estimate what the increase in its future value might not amount to. There was an active competition for the property, which was ultimately sold for 8,150*l.*, its present rental being 350*l.* per annum on a repairing lease for twenty-one years from 1870.

SALE OF A MANSION AND ESTATE IN HERTFORDSHIRE.

An extensive manorial estate in the neighbourhood of London was sold at the Auction Mart, on Tuesday, by Messrs. Debenham, Tewson, & Co. The property consisted of the Ardeley Bury Estate, in Hertfordshire, comprising an old mansion and grounds, 875 acres in extent. It was described as within an hour's ride of the metropolis, and for many years the residence of the late Sir Henry Chauncey, the historian of Hertfordshire, and his ancestors. The sale took place by order of the executors of the late Mr. Philip Longmore. The actual present annual rental of the farms on the estate, together with the great tithes, was stated to be 1,500*l.* a year, and the estimated annual value of the whole estate, including the mansion and park, 2,000*l.* The bidding commenced at 20,000*l.*, and on 28,000*l.* being offered, the biddings slackened, upon which Mr. Tewson, the auctioneer, observed that at 40,000*l.* the purchaser would obtain four per cent. for his outlay, from the present actual rentals, giving him the mansion, the park land, and all the valuable timber, for nothing. He added that from his experience, land in the North of England, as a rule, actually sold for more than land in the neighbourhood of London, for which he was altogether at a loss to account. On 35,000*l.* being offered, he declared it to be an open sale, and ultimately the property was sold for 36,000*l.*

Wandsworth.—On the 16th ult. Sir Charles Reed, M.P., chairman of the School Board for London, formally opened a new building erected by the Board in Warple-way, Wandsworth. The school will accommodate 603 children, and the total cost amounts to 6,671*l.* 14*s.* 8*d.*, being at the rate of 11*l.* 1*s.* 3*d.* per head. Mr. E. R. Robson is the architect. Sir Charles Reed, speaking of the work that was being done by the Board, said that it had 311 schools under its charge, most of them built and handed over to the Board, all in working order, and all of them practically full. In these schools there were 219,000 places, and 233,000 children on the roll.

THE LINCOLN MEETING OF THE ARCHÆOLOGICAL INSTITUTE.

This year's country congress of the Royal Archæological Institute of Great Britain and Ireland was held in Lincoln and neighbourhood last week. The opening proceedings took place on the 27th ult., when the Corporation presented an address of welcome, to which Lord Talbot de Malahide, president of the Institute, replied, and the Bishop-Suffragan of Nottingham, as president of the Associated Architectural and Archæological Societies of the diocese of Lincoln, county of York, and archdeaconry of Northampton, having read an address of welcome in the name of that body, Lord Talbot de Malahide vacated the chair in favour of the President of the Congress, the Right Rev. the Bishop of Lincoln, who, on assuming the chair, delivered his inaugural address. In the course of this he said,—Archæology emancipates us from the thraldom of modern prepossessions and prejudices, and frees us from the tyranny of ephemeral passions and local conventionalities. It makes us contemporaries with every age and citizens of every clime. We are too prone to be absorbed and engrossed by the things of to-day, and to be the slaves of personal interests and party trammels. We need to be liberated from such vassalage. Archæology does this, if studied aright, and especially if it is connected, as your present visit to Lincoln is, with a tour and pilgrimage to places hallowed by the memories of great men in bygone ages. In the Roman arch standing in the northern wall of the ancient citadel of Lindum, and spanning the military road which stretched from Lincoln to the Humber, we may imagine ourselves spectators of the warlike regions of the ancient mistress of the world which marched along those great martial highways, marked by milestones of which one was disinterred the other day from its grave of 1,600 years; and near it we may listen in fancy to oratorical pleadings of lawyers in the ancient Roman Basilica, of which the columns of the façade have just been revealed to our view. Near them we are brought into contact with the greatest of Saxon kings and of Norman conquerors in his feudal castle of Lincoln, and with one of the greatest of Norman bishops, St. Hugh, and with St. Hugh you will also hold spiritual communion in your visit to the noble Minster of Stow and to Stow Park; and when you make your pilgrimage to Southwell and its grand Collegiate Church, soon, we hope, about to become the cathedral of a new diocese, you will be brought into union with Paulinus, the apostle of Northumbria and Lindissi, in the seventh century, who built a church at Lincoln, and with Cardinal Wolsey, Dean and Bishop of Lincoln, in the sixteenth, and King Charles I., in his latter days, in the seventeenth century. You will thus be brought into sympathy with great men, and into synchronism with great events, and will drink in a refreshing draught of that generous spirit which the study of archæology freely ministers, and which, if we are not wanting to ourselves, will make us wiser and better men. We might, my lord, if time allowed, dwell on that consolatory influence which this study exercises in times of sorrow. It was said by the greatest critic of antiquity that tragedy has a purifying power, because it displays noble examples of suffering. There is also a tragedy of events, and of places connected with great events, and this has a purifying, elevating, and soothing influence. When we contemplate the desolation and ruins of ancient buildings and cities,—of palaces, churches, abbeys, and castles,—we forget our private griefs in a feeling of sympathy with public sorrows. One of the most instructive revelations which this study presents to us is that of the deep feeling of religion which animated the greatest nations of antiquity in their most heroic days, and which showed itself not only in their cities at home, but wherever they planted colonies abroad. Let any one stand in the solitary plain of Pæstum, or on the hilly ridge of the Sicilian Girgenti,—the ancient Agrigentum,—and contemplate the group of magnificent temples on both those sites, or in the sequestered vale of Segesta, and look on that noble religious fabric standing there in its lonely grandeur, or on the huge columns of Selinus thrown prostrate by an earthquake, or let him stand on the Areopagus at Athens and look at the Erechtheum and Parthenon towering above him, and let him remember that all these grand buildings were works of religion, not, indeed, rightly directed, but grounded on a belief in unseen heavenly powers controlling human affairs, and in a future state of rewards and punishments; and let him consider also that those who erected those noble public religious buildings cared little for their own private houses, which were comparatively mean and insignificant, and he will feel himself constrained to ask whether we may not learn some lessons of religious zeal and self-sacrifice, especially in this sceptical age, from heathens themselves. The first thing that some of them did in planting a colony was to build a magnificent temple. Where are our cathedrals erected by England in her own colonies? One topic more. We may claim also for archæology the honour of illustrating the inspired text of Holy Scripture and confirming the truth of Revelation. The researches of Rosellini and Sir Gardner Wilkinson in Egypt have refuted the allegations of certain sceptics, and have corroborated the Mosaic narrative. The cuneiform inscriptions of Nineveh have proved that Samaria was not taken by Shalmanezer,—as some have supposed, but as the Bible nowhere asserts,—but by Sargon, once mentioned by Isaiah, whose history they have revealed. And they have shed a flood of light on Hebrew prophecy. Archæological researches at Babylon have brought to light Nebuchadnezzar's own account of his magnificent works in which he gloried, and have explained to us why Belshazzar is represented by Daniel as chief in power at Babylon when taken by Cyrus. Similar contributions have been recently made by archæology to the elucidation of the New Testament.

After the members and friends had, to the number of about 200, partaken of luncheon in the Masonic Hall, at the invitation of the Mayor (Mr. F. J. Clarke), there was a general inspection and perambulation of the city. Amongst the buildings visited were the churches of St. Mary-le-Wigford and St. Peter-at-Gowts, "John o' Gaunt's Stables," &c.; and in the course of the afternoon a goodly party assembled at the Castle, which was described by Mr. G. T. Clark. The Rev. Prebendary Scarth subsequently described the Roman remains seen in the course of the afternoon.

In the evening the Antiquarian Section met, under the presidency of Sir C. H. J. Anderson, bart., who delivered an address in the course of which he referred to the recent discovery of Roman remains in Bail-gate, and said there could be no question that modern Lincoln was built over the old Roman city,—particularly Above-hill,—some 7 ft. or 8 ft. above it, indeed, which had been satisfactorily proved by the discoveries alluded to. Mr. G. T. Clark afterwards read a lengthy and able paper on "Post-Roman and English Earthworks."

In the Historical Section the Dean of Ely presided, and the Bishop Suffragan of Nottingham read an interesting paper on "Little St. Hugh of Lincoln." The Rev. Precentor Venables afterwards read a paper on "The Jews of Lincoln," which had been prepared by Mr. D. Davis.

The Architectural section met on the 28th ult., under the presidency of the Right Rev. the Bishop Suffragan of Nottingham, when Mr. J. T. Micklethwaite read a paper on "The Growth of a Parish Church." In the Historical Section, the Rev. Canon Wickenden read a paper on "The Muniments of Lincoln Cathedral," and the Rev. Canon Perry one on "Some Episcopal Visitations of Lincoln Cathedral." In the afternoon there was an excursion to Gainsborough and Stow, and at a *conversazione* in the evening an interesting paper on "Lincoln in 1644" was read by Mr. E. Peacock, F.S.A.

We may have more to say about the congress next week.

Drury-Lane Theatre.—Four renters' shares in Drury-lane Theatre were sold by auction last week by Mr. George Robins, at the Guildhall Coffee-house, by order of the executors of the Rev. C. G. Freyer, deceased. The particulars stated that a renter's share in the theatre was originally entitled to 2s. 6d. per night of performance, since reduced to 1s. 3d. per night, but now paid an annual dividend, with a free admission admitting upon all occasions and to every description of performance. It was stated that the last dividend declared, which was paid in February last, was 5*l.* per debenture, and that the dividends have ranged from 8*l.* 5s., in 1873, up to 11*l.* 17s. 6d. in 1878, and 7*l.* in 1879. The four shares realised 55 guineas, 63 gs., 65 gs., and 68 guineas respectively.

KENT ARCHÆOLOGICAL SOCIETY.

The annual excursion of this society took place last week, the *rendezvous* being Headcorn, where a meeting was held, the President of the Society, Earl Amherst, in the chair. The annual report, read by the hon. sec., Canon Scott Robertson, stated that all the papers for the thirteenth volume of "Archæologia Cantiana" were now printed, and the illustrations complete. The balance at the bankers amounted to 292*l.*, all of which and more would be required to defray the cost of printing and illustrations. The number of members continued to increase. Early this year the site of the Premonstratensian Abbey of St. Rhadegund, at Bradsole, near Dover, had been excavated, and many discoveries made respecting the Abbey church and buildings. Interesting discoveries of Roman and Saxon remains had been made by Mr. G. Payne, of Sittingbourne, upon three different sites,—two in Sittingbourne and one in Milton. The re-election of officers and other formal business having been transacted, a visit was paid to the parish church, dedicated to SS. Peter and Paul, and not long since restored. A notable feature of the churchyard is an oak-tree, said to be 1,400 years old.

Smarden was the next place reached, the visitors on entering it passing by picturesque timber-framed and plaster houses, dating apparently from the times of the Plantagenets and the Tudors. The visitors entered the churchyard by the singular lych passage of timber. When the company had assembled within the edifice, the Rev. Francis Haslewood, rector of St. Matthew's, Ipswich, a son of the late rector, read a very interesting paper on "Smarden Church and Village." The church consists, he stated, only of a nave and chancel, with a square embattled tower at the south-west end, with octagonal turret. It is dedicated to St. Michael, and is popularly known as the "Barn of Kent," on account of the singular construction of its roof, the nave being 36 ft. wide, without side-aisles, and with no tie-beams to support it. In 1869 the whole fabric underwent restoration.

High Halden Church, the next stage reached, has a large octagonal oaken western tower, on which is a square spire, covered with shingles of the same material. The base is of massive oak trunks, in the smoothing of which on their removal from the neighbouring forest no great amount of labour appears to have been expended. There is a western porch and a southern porch exhibiting good specimens of carving, and the time-worn surface of the wood is of a charming silvery colour from the lichen growth which covers it. The date is 1430, and it is estimated that there are not less than fifty tons of timber in the tower, spire, and entrance.

Woodchurch, the next point, was reached through winding lanes. The church has an Early English chancel, with Purbeck marble shafts to the windows.

Tenterden, the centre of the excursion, was reached in time for dinner in the Town-hall. In the evening a meeting was held in Freeman's Auction-room, in the High-street, where a temporary museum of much interest had been arranged, under the direction of the Rev. F. Haslewood, the Rev. Tress-Beale, Mr. J. Ellis-Mace, jun., and Mr. Willsher. To this museum the corporation contributed largely, lending, among other things, the borough maces; the old charter of Elizabeth and copy of charter of Henry VI., copied in the reign of Elizabeth; and old documents of the fourteenth and fifteenth centuries. Then there were Roman remains selected from the discoveries made at Bayford, near Sittingbourne, by Mr. G. Payne, jun., F.S.A., during last winter; a large contribution of coins of different dates and nations, Roman remains, ancient vases, and other objects, sent by Mr. W. Young, Lodge, Godinton Park; fine old lace of the seventeenth and eighteenth centuries, sent by Mrs. Curteis Whelan; rubbings of brasses, sent by Mr. R. H. Oyler, the Rev. Tress-Beale, and Rev. F. Haslewood; copies of wall-paintings from the crypt of Canterbury Cathedral; and other objects too numerous to mention.

"The Early History of Tenterden" was the subject of an interesting paper read by Mr. R. Turley. The Rev. R. Cox Hales read a paper entitled "Brief Notices of the Hales Family," and Canon Jenkins one on the "Guldeford Family."

The *rendezvous* of the second day's excursion was Appledore, where the vicar, the Rev. M. D. French, acted as *cicerone*. The route was next

towards the Isle of Oxney, and after paying toll for passing the tiny ferry-bridge, Stone Church was reached, whose embattled tower of three stages, with beacon-turret, commands an extensive view of the surrounding country. The Rev. E. M. Muriel, rector of Ruckinge, here read a paper. He stated that the edifice is dedicated to St. Mary, and consists of nave, north and south aisles, chancel, and north and south chapels. The entire architecture is Perpendicular. The whole has been recently restored. From the church the company proceeded to the vicarage garden, to see an ancient Roman altar-stone. This altar, according to Hasted, was removed from the church and made a horse-block of, by which means it was much defaced and cracked; but Mr. Gosling, who was vicar from 1753 to 1777, had it repaired and placed upright where it now stands. The altar is of stone, with a basin hollowed in the top, and the figure of an ox carved on the sides; one side is now tolerably perfect, the other much defaced. Wittersham, Rolvenden, Newenden, and Losenham Manor-house were visited in succession. The ancient earthwork, about a mile from Losenham, attracted much interest. Mr. G. Lambert, F.S.A., suggested that this and similar mounds in various parts of England served for the erection of beacons, or as places of refuge for cattle on the occurrence of floods. The excursion was a very pleasant and successful one.

IMPROVEMENTS IN HOUSE PLUMBING.

In response to an invitation from the New York Board of Health, a number of architects and sanitary reformers have been discussing Proper Regulations for the Plumbing of Houses. The *American Sanitary Engineer* gives an account of the proceedings, which may be usefully reprinted:—"The discussion, especially of the moot point whether a trap should be placed on all main drains to disconnect the house from the sewer, was animated and vigorous. Mr. James G. Bayles read a written statement of his objections to this appliance, of which the following is a summary:—

1. They obstruct the flow of drainage and cause accumulations of foulness in house drains.
2. Air admitted by ventilation above the 'seal' and passed all through a trapped house-drain, is found by experience to be fouler than air drawn from a sewer.
3. The trap does not offer any effectual resistance to air from sewers when there is a pressure.
4. That the danger of disseminating contagion originating within them, through tenement and apartment houses, is probably greater with a trapped house-drain than it would be from an open connexion with the sewer.

This view was sustained by Mr. W. E. Partridge, and by Messrs. Mead and Manny, while arguments in favour of such a trap were advanced by Walter G. Elliott, Thos. J. Nealis, Engineer of the Board of Health, Chas. F. Wingate, and others.

Further details of house-plumbing were then discussed, and it was agreed that the following requirements should be enforced by the Board:—

1. All plumbing work to be of good materials.
2. Only good workmen to be employed.
3. All soil-pipes to be of iron.
4. All soil-pipes to be accessible throughout their entire length for inspection.
5. All soil-pipes to extend through the roof and to be of undiminished calibre.
6. All sewer-pipes to be of iron.
7. That sewer pipes be above the cellar floor and not buried.
8. That all joints in sewer and soil pipes be gas and water tight, and that they be caulked with either lead or with iron filings and sal ammoniac cement.
9. That traps be provided for all basins, sinks, bath-tubs, and water-closets.
10. That all traps be ventilated by special pipes through the roof.
11. That there be no traps on vertical soil-pipes.
12. That the 'safes' under basins and refrigerators be drained by special pipes not directly connected with the sewer.
13. That all service pipes be so placed as to be beyond danger of freezing.
14. That their be no pan water-closet, but either hopper or improved water-closets.

This concluded the discussion, which it is to be hoped will be fruitful in good results, both in awakening householders to an appreciation of what constitutes good drainage, and also in compelling house-owners and plumbers to carry out such provisions.

The Board of Health already possess abundant powers regarding the drainage of dwellings, which have hitherto been exerted mainly in a few particulars, viz.: carrying soil-pipes to the roof; putting traps on all fixtures, and ventilating privy vaults. It is to be hoped that they will, as now proposed, extend their jurisdiction still further, so as to include all the requisites of good drainage, and see that these are strictly enforced.

If this is done, to the extent set forth in the above memorandum, we trust the days of the 'jerry' builder will be numbered, and that 'crooked plumbing' will be hereafter less common than hitherto, if not wholly abolished."

PLUMBERS.

Sir,—Having seen several articles in your valuable paper about the bad workmanship and unscientific manner in which water-closets, soil-pipes, &c., have been fixed, I should like to mention two things that would seem almost impossible for any man in his right mind to do, but such is the case. I went about a month ago to see to a sink in a house on the first floor. There was such a horrible stench in the place that it was almost unbearable. I examined it and found that it came from the waste-pipe from the sink, which went into the soil-pipe, right into the top of it, without any attempt at a trap, excepting a very small bell-trap in the sink, which was lost. When I took the closet-seat down I saw it at once. That pipe into the soil-pipe was exactly like an air-pipe put in to carry all the foul gas into the living-rooms; and in my opinion the man that put it there ought to be in jail. The other instance was in a large house, where the waste water and all slops from a sink were conveyed into the standpipe in the large cistern of drinking-water on the first floor, as well as from a large bath that was frequently used. The people in the house could not make out for some time why the water was so muddy and discoloured. So they sent for some one to go to see to it, and I went and found it as I have described. Now, sir, that waste-pipe from the cistern was completely choked, and all the water and slops from the bath and sink had been running into the cistern for some time, until it got so bad that the people in the house could not drink the water, and one day it overflowed after some one had used the bath, which helped them to find something amiss. How long it had been so, I do not know, but the cistern was covered with black slime, just like mud. Now, sir, these are only two solitary instances. I could tell of many similar in some of the largest mansions in South Belgravia. There are a large number of them that I have found to have no ventilating-pipe at all, and the sinks and bath wastes all go either into the soil-pipe or closed trap. I suppose they will have them altered when there are one or two killed by sewer-gas or fever. Why are houses left in this state when the consequences are known, and why are they allowed to remain? I have no doubt a great deal of it is caused by workmen who have no idea what sewer-gas is. They know it smells badly, and that is about all. I am only a young man, and cannot pass much opinion; but I think that plumbing is left in the hands of men a good many times that do not understand what they are doing, and ought not to have the name of a plumber. I know of a small shop now where the foreman was never anything but a boy in a builder's yard, and worked himself into where he is by being deceitful and always telling tales about the other men. What right had he to go about to see to such work when he could not even wipe a joint and is quite illiterate in such matters? Why I write this is to strengthen the opinion expressed by one of your readers, who said that every plumber ought to pass a sort of examination before he is engaged, especially on inside work, and I hope this will be considered by master plumbers and others.

A Plumber.

"COMPETITIONS": EXETER HALL.

Sir,—As there was a note in your issue of the 24th ult. giving the names of three gentlemen who were invited to send in designs for alterations to the above, it may interest the profession to know the terms which were offered to three other architects for designs to be sent in for competition. Two of those named,—Mr. Pite and Mr. Bell,—were originally invited to submit designs with Mr. Paull, Mr. St. John H. Hancock (Furnival's Inn), and Mr. Maberley (architect to the late owners of the hall), on these terms:—25*l.* for each set of drawings *except the successful one*, and the owner of the selected design, if other than Mr. Pite, to share his commission with that gentleman, with joint supervision of the works. The last-named three gentlemen declined these terms, as the result shows, and were not offered any other.

Inquirer.

WORKING-MEN'S HOUSES AT THE WEST END OF LONDON.

HIGH RENTS AND UNHEALTHY DWELLINGS.

A crusade has been started, at the instance of members of the working classes employed in the western districts of the metropolis, against what are designated excessive rents and unsanitary dwellings, and on Sunday evening a meeting on the subject was held at the Democratic Club in Rose-street, Soho, when statements of a grave character were made as to the unhealthy condition of the houses in the district, whilst the rents were stated to be enormous. It was said at the meeting that the working-class population of the West End made all sorts of articles of luxury, to produce which they were compelled to reside in the neighbourhood, and occupy houses for which they were forced to pay high and exorbitant rents, whilst the houses themselves were scarcely fit to live in. The consequence was that the industrial classes in the locality were both plundered and poisoned. Several of the speakers complained of the systematically-oppressive conduct of the "house-farmers" to whom these exorbitant rents were paid for houses scarcely fit for occupation. In the course of a discussion it was suggested that the co-operation of other metropolitan organisations should be solicited, inasmuch as there was not a part of London unaffected by the grievances of which they complained in the West End, and this course was resolved upon. "A Provisional Committee for Rental and Sanitary Reform," was formed, and the secretary, Mr. Edward Dunn, was requested to communicate with all the working-men's organisations in London, with the view of their sending delegates to the committee. The objects of the organisation are summed up in the following resolutions:—"That the exorbitant rentals obtained for certain classes of houses, create a powerful interest opposed to all sanitary reform, promote the maintenance of slums, and hinder the progress of public improvements." Also, that "the Building Acts are flagrantly evaded in the newer districts, and in the old quarters whole tracts of land are depopulated and left unoccupied till house-farming capitalists build thereon." It was stated at the meeting that one of the rules of the house-farmers is to the effect that if a tenant complains of the unsanitary state of the house, or insists on his tenement being repaired and put in order, process of ejectment is at once resorted to by the house-farmer.

CASE UNDER THE NEW BY-LAWS OF THE METROPOLITAN BOARD OF WORKS.

Mr. T. J. Neale, of 33, Aylesbury-street, Walworth, builder, was summoned, on the 22nd, before Mr. Ellison, at the Lambeth Police Court, for an infringement of the new by-laws issued by the Metropolitan Board of Works, under the Metropolis Management and Building Acts Amendment Act, 1878, in using bad mortar in the erection of a new building in the rear of No. 80, Old Kent-road.

Mr. George Lansdown, district surveyor of East Newington and part of St. George the Martyr, Southwark, appeared in support of the summons, and explained that the builder had received notice to amend under the Building Act, as well as under the by-laws, but had neglected to amend, and had left the work. The defendant pleaded guilty. The magistrate fined him 5*s.*, and 2*s.* per day for each day since notice to amend, and 2*s.* costs: total, 27*s.*

The penalty in case of the breach of any of the provisions in the by-laws is a penalty not exceeding 3*l.*; and in each case of a continuing offence, a further penalty, not exceeding 20*s.* for each day after notice thereof from the Board or district surveyor.

Since the hearing, the building has been entirely taken down.

EMPLOYERS' LIABILITIES.

RAHTSKE *v.* EDWARDS AND OTHERS; CARROLL *v.* SCOTT AND EDWARDS.

These were two actions (heard at the Liverpool Summer Assizes, before Lord Justice Bramwell) to recover damages for the death of plaintiffs' husbands, which resulted from the fall of a scaffolding, caused, as the plaintiffs alleged, by the defendants' negligence. As the cases arose out of the same facts and the same firm were defendants, although the names appeared differently on the records, both actions were tried together.

It seemed that the two deceased men were employed in the construction of a new bridge on the Cheshire Lines Railway, and were killed by the falling of a staging which had been erected for the purpose of riveting. The scaffolding was erected by the defendants, who were the original contractors for the work, and the deceased men were in the employ of a Mr. Pargiter, who was the subcontractor for the ironwork. It was admitted that the

scaffolding was incomplete and unfit to bear the weight that was put upon it, and the real question was, by whose fault the deceased were set to work on a dangerous stage. The plaintiffs' case was that Pargiter and his men were at work on the day before the accident, with the knowledge and approbation of Cornish, the defendants' engineer, and that he had told them that it was all right, and they could go on working. It was shown that Pargiter had been pressing Cornish to get the staging completed so that he might go to work. On the other hand, Cornish denied that he had ever told them the stage was ready, and also that the men were at work on the preceding day. According to him, the stage was entirely incomplete, no part of the flooring having been put on until just before the accident, and he was about to make it fit for use by adding another upright. In this view the accident was caused by Pargiter ordering his men to go to work on the stage before it was fit.

His Lordship, in summing up, told the jury that if Cornish, by word or deed, represented that the staging was fit for use, they ought to find for the plaintiffs; but if Pargiter, on his own responsibility, chose to send his men to work before it was safe to do so, the defendants were not liable.

The jury found for the defendants.

PROVINCIAL NEWS.

Wordsley, near Stourbridge.—New offices, seed warehouse, and a manager's residence, are being erected by Messrs. Webb & Sons, at their extensive seed establishment, near Stourbridge. The former comprise, on the ground-floor, an entrance-hall and staircase, with general waiting-room attached; a ledger-office, 60 ft. by 24 ft., with manager's office at one end; fireproof-room, cloak-room, and lavatory, and a private staircase to the upper floor, on which are arranged a suite of offices for the Messrs. Webb and heads of the several departments, together with sample-room, cashier's office, and a spacious reading-room and library for the use of the *employés*, which is approached from the entrance-hall by a staircase of polished pitch-pine. The seed warehouse is in continuation of the present buildings, and is five stories high, each floor having an open space of 88 ft. by 40 ft. Steam lifts and staircases are provided, together with offices for warehousemen, lavatory, &c. The communications betwixt the new and present warehouses are to be closed by fireproof doors. Speaking-tubes are provided to all the offices, and the telephone is to connect them with the seed warehouses, which are on the opposite side of the courtyard. The buildings are being carried out by Mr. Lovatt from designs prepared by Mr. J. R. Veall, architect, Wolverhampton. The materials used are red pressed bricks, with Hollington stone dressings. The cost will be nearly 7,000*l.*

Garston.—The Mersey Conservancy Commissioners have given notice of projected improvements at Garston Docks, which are to be commenced within two months after notice. The object of such works is to form an improved river front and approaches to the company's docks. The proposed wall will project on to the foreshore of the Mersey, and will not impede or interrupt the tidal water to the river, but on the contrary it is stated that the excavations for the approach to the dock will more than compensate for the abstraction of any tidal water arising from the construction of the wall. The secretary of the company states, for the information of the Commissioners, that the South Garston Dock and Warehouse Company is formed for the purpose of constructing an important dock at Garston, with warehouses attached, which will supply the urgent demand for additional accommodation on the Mersey, and thus meet the requirements of Liverpool, Manchester, St. Helens, Wigan, and the surrounding districts in the county of Lancaster. The area of the dock property comprises about thirty acres; the water area will be about seven acres, with about twenty-three acres for warehouses, sheds, quays, and railway sidings.

COAL-GAS EXPLOSION.

Sir,—In your number of the 24th ult. you touch, among other matters, on the explosive nature of coal-gas in coal mines, where bore-holes are made to tap the workings for gas. In order to neutralise the explosive nature of the above gas in mines, it has often struck me that whenever danger is expected therefrom, jets of steam might be applied effectually for that purpose. Miners at work must certainly be sufficiently sensible to know when this gas is accumulating too fast. I propose, then, when such is the case, that a copious supply of steam be immediately sent down from above, through the air-shaft. I am not aware that steam has ever been so employed in coal-mines.

J. T. Lockhart.

A QUESTION IN VALUATION.

Sir,—A railway was made some twenty years since through an estate running along the side of, and near the bottom of, a hill which is loaded with large quantities of green sands, through which the head-water above percolates. In making this railway those green sands were cut into from 15 ft. to 20 ft. in depth for a length of nearly a quarter of a mile, and the consequence is that those sands have been constantly running out ever since to a very considerable extent, and in all probability will continue to do so for years to come. The result has been that, as those sands discharge themselves from the bowels of the earth, a space is thus formed, and after a while the upper stratum, or top crust, breaks away and settles down, and so very materially interferes with the cropping of the land and the vegetation thereon, as well as destroying several orchards of a thriving and excellent kind.

An action was recently brought against the Company for compensation for the damage so done to the lands by the landowner. The damage was set by the landowner's surveyor at so much, based as follows:—The *original* agricultural annual value of those portions where the slips and subsidences had taken place having been put at what they were fairly worth, had no disturbance of such lands occurred, at the usual thirty years' purchase for the fee-simple thereof, against this the *present* value was obtained by taking the same portions of lands at what they were considered worth for agricultural purposes at the present moment per annum, and the value in fee of the same reckoned at from thirteen years' to twenty years' purchase, according to the nature and dangerous state thereof.

The railway company's surveyor objected to this mode of computing the value of the alleged damage as made by the landowners' surveyor, on the grounds that it was inconsistent and an unknown basis to go on; that having reduced the agricultural value in the first instance, the landlord's surveyor had no right to lessen the year's purchase also thereon. The landowner's surveyor contended that, inasmuch as those affected portions of land were not stationary, but movable and in a running away state, they ought to be treated more like house-property than otherwise.

It would be a matter of great satisfaction to have the opinions of some of your readers,—being experienced, and I may say expert, land surveyors, on this matter,—as to which of these two surveyors may be considered correct in his theory.

A Constant Reader.

FRENCH WORK AND WAGES.

Sir,—Herr Carl Behr, in your issue of the 31st ultimo (page 131), referring to the rate of wages paid to makers of artistic furniture in Paris, mentions that some of the workmen at M. Henri Fourdinois' well-known establishment in that city are paid as much as five francs (4*s.* 2*d.*) an hour.

Whilst in Paris, in October, 1878, preparing a report at the instance of the Exeter Chamber of Commerce, I visited a great many of the principal establishments there, and amongst them that of M. Fourdinois. That gentleman, in the most courteous manner possible, placed his premises at my service, and I had more or less conversation with nearly every workman in his employ. I find, upon reference to my notes, that, when in full swing,—trade was so dull that all hands were upon "half time" during the time I was there,—the regular hours were from 7 a.m. to 7.30 p.m., with one interval only between,—from 10.30 till 12,—for breakfast. On Saturday the time worked was the same as on other days. Most of the cabinet-makers and joiners working there were in receipt of 5 francs a day (4½*d.* an hour), though a few were paid at a rather higher scale. The carvers' wages varied, every man being remunerated according to his ability. The highest money any one was at the time receiving was 15 francs a day, *i.e.*, 1*s.* 1½*d.* an hour. I had these quotations from the men themselves, and afterwards what they had told me was verified by the cashier. Herr Behr goes on further to say that the best work is executed in Paris by German workmen, but that, unfortunately, as his countrymen at home will not pay the long prices paid in Paris for wages, these skilful men are lost to Fatherland. I certainly was not impressed by the preponderance of German art-workmen in the shops I visited, and my impression is that in my perambulations I met with very few of them indeed. The Berlin cabinet-makers are at the present moment out on strike. They demand more money and a lessening of the hours of labour. Their present wages are about 5*s.* per diem, or, so far from being less than their French neighbours, about 1*d.* an hour more than the majority of M. Fourdinois' cabinet-makers receive, and seem content with, in Paris! In some of his statistics, as well as in his comparisons, Herr Behr is assuredly in error.

Harry Hems.

THE USE OF MARBLES IN LONDON.

Sir,—In a notice of Mr. Benson's "Business Premises" in your last issue (page 155) polished marbles are inferentially recommended for external use in London street architecture. Allow me to raise a word of warning. There is ample evidence in the streets of London itself to prove that no marble (compact altered limestone) will retain its polish out of doors for any length of time in a humid atmosphere like that of England; and in large towns a year or two at most will find all its beauty gone. The Devon and Irish marbles, being comparatively soft and uneven in texture, yield quicker than others, like the Sicilian, of more uniform texture and greater hardness. They are very beautiful under polish and when wet, as one sees them commonly in the streets of Plymouth; but wherever they are exposed to dust and damp their charms are very ephemeral. Serpentine, being an igneous rock, keeps its polish longer, but it is not permanent in large towns. The granites, carefully selected, are the only building stones that can be relied upon to retain their lustrous polish out of doors in a damp, dusty, smoky atmosphere.

I venture to recall attention to this question of the durability of polished stone, because, regarding the *Builder* as a safe authority, many men might be tempted to embark in a decoration at first so pleasing, but that leads to results satisfactory neither to the architect nor to his employer.

Thos. C. Sorby.

HOW TO DIMINISH RAILWAY ACCIDENTS.

Sir,—I venture to submit the following scheme for your approval:—Give the companies a direct inducement to adopt every means and precautions to avoid accidents by converting the passenger-duty into a tax on *preventible* accidents to trains, whereby passengers are killed or injured. Thus, any company which has no such accident in a quarter of a year shall be entitled to remission of the duty for that quarter, and so on.

Among the means of improvement are these:—(*a*) Strengthening bridges (many have been swept down lately), keeping the permanent way in the best condition possible, continuous brakes, block system, interlocking apparatus; (*b*) additional parapets where bridges cross rivers, extra siding accommodation, guard-rails, &c.

The passenger-duty brings in about 800,000*l.* per annum to the revenue; perhaps my scheme might cause a loss of half that. It might be a tentative measure for five years. If the companies spend all that is remitted in adopting extra precautions, their net gain will be the cost of accidents avoided.

R. Varley.

Sale of Prisons and Barracks.—At the Auction Mart, on Wednesday, a sale of a very special character was held by Messrs. Edwin Fox & Bousfield, acting on the instructions of the Home Secretary and Prison Commissioners, and of the county authority for Middlesex. The property offered comprehended the six prisons of Bath, Wisbech, Bury St. Edmund's, Southwell, Mould, and Beverley, which were described as freehold estates now available for building, being no longer required for their original purpose, in consequence of the alterations effected in the administration of justice under the Prisons Act of 1877. They comprise altogether about 17¼ acres, were offered in six lots, and the total amount at which the lots were knocked down was 17,850*l.* The principal lots were sold. The barracks situated at Hampstead, not now wanted for militia purposes, in consequence of the head-quarters being removed to the depôt under Lord Cardwell's organisation scheme, comprised about one acre of land suitable for building, and were sold for 5,500*l.*

IRISH ARCHITECTS AND PUBLIC BUILDINGS.

At a conference of Irish architects that has just concluded in Dublin, under the presidency of Mr. J. M'Curdy, the following resolutions were unanimously adopted:—

"That general and well-grounded dissatisfaction prevails among architects practising throughout Ireland as to the system which sprang up under late Governments, and which is apparently being perpetuated and extended, under which the designing of public buildings has not, as in former times in Ireland (and is still customary in England), been entrusted to independent architects of eminence and repute, and that thus a considerable amount of valuable and honourable employment is unduly withdrawn from the profession in Ireland. That this meeting views with considerable alarm the practice now adopted by the successive Governments of the country of handing over to departmental officers such works as should naturally form one of the most essential elements of ambition in the architectural profession, viz., the designing of Governmental works of importance; and that the withdrawal of these works from the profession generally is an injustice that it can hardly believe the various Governments can have foreseen, and which they are led to hope need only to be brought fully under their notice to have rectified. That it should be respectfully urged on the present and successive Governments that this system, prejudicial to the public service and the credit of the country, should, wherever practicable, be relaxed and reversed; and that such buildings as museums, colleges, custom-houses, post-offices, law courts, Government schools, prisons, &c., should, under any system of selection that may be deemed judicious, be entrusted to independent architects, as formerly. That, in view of the proposed buildings of the Science and Art Department, the present is a suitable time to urge the consideration of the foregoing resolutions on her Majesty's Government. That steps be taken to make representations on the basis of these resolutions to the Lord-Lieutenant, the Chief Secretary for Ireland, and the Treasury."

WOODEN CHIMNEYPIECES.

SIR,—Architects and district surveyors would do well to see that the Building Act is not infringed by the erection of wooden chimneypieces where the wood ingrounds are fixed against the stove without any marble whatever. There should be some precaution taken, otherwise there will be a serious fire, and then the insurance companies will insist on flimsy wooden chimneypieces giving place to something better.

J. H.

BRICKMAKING.

SIR,—Referring to the letter signed "Brickmaker," which appears in your issue of the 31st ult., I have pleasure in handing you per this post a pamphlet entitled "Bricks and Brickmaking." Your correspondent will find some information in it which may be of use to him; but if he requires further particulars or advice, I shall be pleased to give it him if he will communicate with me. I am acquainted with nearly every brickmaking machine, and would tell him which would be the most suitable for the kind of clay he wishes to work. J. W. IVERY.

West Bromwich.

SIR,—In reply to "Brickmaker," there is a later edition of Dobson's "Brick and Tile Making," which gives a good elementary knowledge of brickmaking. Brickmakers will gain a great deal of useful practical knowledge by visiting a brickyard laid out on the most modern system for making bricks, tiles, &c. We shall be pleased to show him, or any reader of your journal, over several of such yards, or to give them any information on the subject.

Bury, Huntingdon. ARMITAGE & ITTER.

PLUCKLEY.

SIR,—Permit me to rectify an omission in my paper on "Brick and Tile Making at Pluckley," which is quoted in your issue of the 17th ult. I should have stated that these works were designed and erected by Mr. Henry Ward, C.E., of 61, Old Broad-street, who is engineer to the Company.

A. J. BURROWS.

Sunday Visits to Picture Galleries.—On Sunday last the Exhibition of the Society of British Artists, and the Summer Exhibition at the Grosvenor Gallery, were open to the public under the auspices of the Sunday Society. The visitors were admitted by tickets, which had been procured on written application. Each exhibition was open for two hours and a half. At Suffolk-street the number of visitors was 1,317, and at the Grosvenor Gallery 2,250.

CHURCH-BUILDING NEWS.

Hardrow (Yorkshire).—The new Church of SS. Mary and John, Hardrow, has been built at the cost of the Earl of Wharncliffe, on his property near Hawes, in Wensleydale, to replace a dilapidated modern structure. The style is of a very simple type of the Transitional to Early English, following the characteristics of the Yorkshire style of that period. The plan consists of a nave, chancel, and porch, with a triple bell-cot at the west end carried on projecting buttresses. The stone is from a quarry just above the church, and is used in coursed facing for both the inside and outside, the dressed stone being from Leyburn and Barnard Castle; great care has been taken, by building the walls hollow, by the use of Settle lime, and by other precautions, to resist the entrance of damp, the place being subject, so it is stated, to the severest weather in all England. The work has been executed by local contractors, under the architects, Mr. R. Herbert Carpenter and Mr. Benjamin Ingelow, of London, Mr. Smith being the clerk of works.

Exeter.—On Tuesday, the 27th ult., the first stone of the enlargement of St. James's Church, Exeter, was laid. The church was built in 1836, but, owing to increase of population, has long needed enlargement. The work was commenced in 1877, under the direction of Mr. R. Medley Fulford, architect, and the first portion of the new work completed consisted of the chancel, with choir, north and south aisles, and priests' vestry. Prominent as the chief feature of the new chancel is the east window, erected in memory of the late Rector, the Rev. A. Buckeridge. It is a triple-light window, filled with stained glass by Messrs. Clayton & Bell. The window contains a representation of the Crucifixion, the Blessed Virgin, and St. John. The work now taken in hand is that at the west end of the church. Mr. J. R. Gibbard is the builder. The portion now to be added will consist of an extension of the nave and side aisles. Exclusive of the porch, it will extend outwards, from east to west, about 22 ft., and 17 ft. from the centre of the old frontage; the extreme width of the transverse section, from north to south, being about 33 ft.,—upwards of 12 ft. wider than the original edifice. The porch will have four buttresses. Three entrance-doors will give access respectively to the nave and to the north and south aisles. On each side of the porch there is to be a two-light window. Above it two two-light windows will be placed; then, a rose window; higher still, a small three-light window; and the whole will be surmounted by a spire, the height of which, as already indicated, will be 108 ft. from the ground to the top of the vane. In the spire provision is to be made for three bells. The spire will be of wood, covered with lead and ornamental slating. Stone from the Pocombe quarry, near Exeter, is the material used in the building, with Ham-hill dressings. In the interior of the edifice monoliths of granite will support the arches separating the nave from the aisles. The old west gallery will be set back. In its complete form the church will afford accommodation for 1,050 persons. The cost of the work now commenced will be 2,500*l*.

Pinhoe.—St. Michael's Church, Pinhoe, near Exeter, has been re-opened by the Bishop of Exeter, after restoration. The church until recently has been in a deplorable state of decay. It has a nave and north aisle, a chancel and a vestry, a south-west porch, and a western tower. The tower is embattled, and has a square turret at its north-east corner. All the rough-cast that covered it, many inches thick, for very many years, has been removed, and the stone beneath has been pointed. The belfry windows have been cared for, and the parapet made good. The porch is entirely new, but occupies the same position as did the former one. The new dressings are of Ham-hill stone, and the apex of its gable is crowned by a cross. The chancel has been almost entirely rebuilt, and a new vestry, upon the north side, has been added. The roofs are of English oak, covered in by slates. The chancel roof is clearly defined by a ridge in Ham-hill and Bath stone courses alternately. In the interior of the church the nave and north aisle are divided from each other by an arcade of four bays. This arcade, like the stonework of so many of our Devonshire churches, is of Beer stone. The windows are three-light ones, surmounted by flowing tracery. They are filled with geometrical glazing of dull cathedral colours. The glazing has been done throughout by Mr. F. Drake, of the Cathedral-yard, Exeter, by whom also the decoration of the chancel roof was carried out. The western window in the tower is only of a temporary character. Mr. Drake has received orders to put a good painted subject therein. In the nave the ribs have, at their springings, carved angels bearing shields. Two old decayed precedents for these remained. These angels have been carved by Mr. Harry Hems, of Exeter. To indicate where the new chancel roof commences, an ornamental cusped rib has been introduced. The nave and aisle roofs have also had some colour placed upon them, but merely as a ground-work for future decoration. The old rood-screen, consisting of eight wide bays, had fallen into so bad a state of dilapidation that it was feared it was almost past repair. It was removed to Mr. Harry Hems's establishment, where the defective parts have been delicately repaired, and all that was deficient has been made good. The old pulpit was also placed in Mr. Hems's hands, and, having been partially restored by him, has been replaced *pro tem.* The unique old poor-box represents the figure of a man with staff and books, dressed in the costume of 1700 or thereabouts. This is supposed to represent the poor man of Pinhoe. Mr. Fulford has designed the surroundings in character with the statue. The restoration of these old works is by Mr. Harry Hems. The nave and aisle are laid with old memorial stones, the spaces between being filled with coloured tiles, as also is the floor of the porch and under the tower. The chancel floor and the sanctuary are laid with encaustic tiles, from Messrs. T. & R. Boote, of Burslem, Staffordshire. The tower contains four bells; but Mr. W. Aggett, of Chagford, has received instructions to prepare a cage for six. The works have been carried out in the main from the designs and under the superintendence of Mr. R. Medley Fulford, architect, Exeter. This applies to the restoration of the nave, aisles, vestry, porch, and tower. The chancel has been restored under the direction of Mr. Ewan Christian, architect to the Ecclesiastical Commissioners. The foreman who has had charge of the work throughout is Mr. James O. Fenning. The total cost of the above work is about 2,000*l*.

DISSENTING CHURCH BUILDING NEWS.

Ryton-on-Tyne.—The foundation-stone of a new Wesleyan Methodist chapel at Ryton-on-Tyne was recently laid. A new circuit, called the Tyneside Circuit, has been formed, embracing Ryton, Crawcrook, West Wylam, Prudhoe, Prudhoe Station, and the neighbourhood, with Ryton as head-quarters. About half an acre of land has been purchased, and on this site a chapel is now being erected. The Early Pointed style of architecture has been adopted, and the chapel will consist of a nave, two side aisles, and transepts. The nave will be divided from the aisles by a series of pointed arches, springing from ornamental cast-iron columns, which will carry a clearstory wall. At one end of the nave there will be a pulpit platform of pitch pine, stained and varnished, and the seating will be by means of open benches of the same wood. The building will be built of stone, and the walls on the outside faced with thin courses of blocking. At the north-west angle of the chapel will be a lofty tower, covered with a slated roof. In the rear of the main building there will be rooms for the caretaker to dwell in, and underneath will be a chamber for a hot-water apparatus. The peculiar character of the plot of ground necessitated an unusual height of foundations, and advantage has been taken of this to provide a large room under the whole area of the chapel. It is intended that the transepts shall not be seated for the present, but be divided from the chapel, and formed into a schoolroom and four vestries. The architect has provided in his plans for an extension of the building, and, when the requirements of the congregation demand it, the transepts will be opened out to the other portion of the chapel, and a lecture-hall and school, with class-rooms, vestries, and other accommodation, will be erected at the rear of the present works, in harmony with the original building. The chapel, as now arranged, will seat 280 persons, and with the extension referred to, 230 more sittings will be obtained, making 510; and the accommodation is arranged to be still further increased by the erection of a gallery in each transept, which will bring up the sitting

accommodation to 620. These extensions may be made by easy and gradual stages, to meet the growing requirements of the congregation. The contractors for the works are,—Mr. W. Lishman, Ryton, mason work; Mr. John J. Salter, Ryton, joiner's work; Mr. J. Rutter, Ryton, painting; Messrs. C. & G. Nicholson, Newcastle, slating; and Messrs. R. B. Charlton & Co., Newcastle, plumbing and ironwork. The building, as now planned, is estimated to cost about 2,950*l*. The architect is Mr. Joseph J. Lish, Newcastle-on-Tyne.

Lostwithiel.—The memoral stones of a new Wesleyan chapel and school were laid on the 14th ult. The site of the new premises adjoins the Restormel-road. The architect is Mr. James Hicks, of Redruth, and the builders are Messrs. Philp & Brown, of Lostwithiel. The building will be Gothic in style, with central gable flanked by pinnacles, and with, at the angle where the school joins the main building, a tower and spire. Attached to and at right angles with the chapel the school will be built, for about 150 children. In design it will correspond in the main with the chapel. The tower, which will rise at the angle, above the entrance, will consist of three stages, terminating in a spire. Crocketed pinnacles at the four corners will match with similar relieving features at the buttresses. In the body of the walls the local shale will be used, faced with killas slate from the Derrycombe quarry. For the plinths, steps, quoins, and copings, granite will be used, and the mouldings will be of Bath freestone. It is hoped the buildings will be completed by next Midsummer. The total cost of the work is estimated at about 1,750*l*.

SCHOOL BOARD SCHOOLS.

Liskeard.—The Liskeard School Board has just opened new schools at Dobwalls and Trewidland. Trewidland school is situated on a ridge of steep rising ground; the style is Queen Anne, with bold gable-framing and half-timber work, and panelled barge-boards. The dressings to windows and doorways are Bridgewater facing-brick, with cills to former also formed with purpose-made bricks. The roofs are slated with red tiles fixed on the ridges. A bell-turret, or flèche, of pleasing design, covered with cleft oak-shingles, is placed over the school-room roof. Accommodation is provided for about eighty children by means of a school-room about 34 ft. by 17 ft., and infants' room 15 ft. by 13 ft, fitted up with a gallery. The roofs of these rooms are open-timbered, being plastered on faces of rafters; the plastering of the walls inside is protected by a dado extending to a height of 4 ft. The usual separate porches for the boys and girls are provided with the necessary offices and yards. A convenient house for the master is attached to the school, containing six rooms and offices, with a small garden in front. The Dobwalls school is similar in external treatment and accommodation to Trewidland, without master's residence. Mr. Skentelbery, of Looe, is the architect, and Mr. Whale was the contractor. The contract for Dobwalls schools amounted to 372*l*., and that for Trewidland (with the school-house) to 649*l*.

STAINED GLASS.

Chislehurst (Kent).—A two-light memorial window, to the memory of a lady deceased, has just been erected in the Wesleyan Chapel of Chislehurst. In the centre of each light is an enriched boss which displays a lily entwined by a riband, bearing a Scriptural legend; the one being, "The Lord is my Shepherd," the other "My Sheep hear my Voice." By instruction, no figure subject is introduced, but instead the lights display a variety of foliated ornament richly treated. The window is designed and executed by Messrs. Powell, Brothers, Leeds.

William's College, New York.—At special services on the 4th of July a window by Messrs. Ballantine, of Edinburgh, commemorating Albert Hopkins, Professor of Astronomy, was unveiled in presence of the trustees and alumni of the college. The design appropriately represents the Psalmist surveying the heavens and uttering the 19th Psalm, from which fit quotations are made. In reference to the devout Christian character of Professor Hopkins, there are introduced the cross, and the passage, "He that turneth many to righteousness shall shine as the stars for ever and ever."

VARIORUM.

Although we take little delight ourselves in imitations of woods and marbles, there are many who do, and many, consequently, who desire to attain skill in the art. These will find advantage in consulting a book published by Crosby Lockwood & Co., entitled "School of Painting for the Imitation of Woods and Marbles, as Taught and Practised by A. R. and P. Van der Burg." It includes numerous patterns in colour, and other illustrations. Some of the workingmen's clubs should give their young men the opportunity to study it.——"Journals and Journalism; with a Guide for Literary Beginners," by John Oldcastle (Field & Tuer), contains a considerable amount of information which will be found useful by the aforesaid beginners. The writer shows that he is ignorant of the position of the *Builder* in the world of letters, but that shall not prevent us from recommending the little book. It will interest others besides those who are looking to distil a fortune through a quill.——"National Industrial Insurance and Employers' Liability," by Geo. Howell (P. S. King, King-street, Westminster), treats the questions involved with moderation and good sense, and deserves the candid consideration of those who are seeking to arrive at a fair settlement of them.——A Special Midsummer Edition has been published of "Bevis's Builders' Price Book" (8, St. Martin's-place), and the author claims to have revised the prices up to that date.——Part VI. of Letts's "Popular Atlas" brings us to the first half-mile stone of the first year's issue, and inasmuch as we know from indisputable authority that a very large circulation is necessary to enable the work to be produced at so low a price, we are sure our readers will pardon us if we again direct their attention to its merits. Eighteen maps are now before us, and we do not hesitate to say that no similar number of maps at such a price has ever been offered to the public; not only for their cheerful appearance, but for the very varied and useful information they one and all contain. Take, for instance, the present part. Whenever has Russia presented to our *mind's* eye anything but a dreary waste of unpronounceable names? Now we have quite another impression conveyed to us: we can realise the great extent of the corn-growing districts; we can read and understand that though twenty times the *size* of the British Isles, its population is but one-eighth that of this country; and that high as Mont Blanc is, there are at least two peaks in the Caucasus *thousands of feet* higher. And this is only an isolated case. Messrs. Letts, having put their hands to the work, have used their heads too, and considered that if a thing was worth doing at all it was worth doing well.——The new number of the *Fortnightly* includes an article entitled "Friendly Societies: their Position and Prospects," by Mr. James S. Randell, in which the writer, who has given much attention to the subject, urges strongly the desirability of establishing a national benefit society. Mr. Randell says in the course of his paper:—"Mr. Blackley, in an able article in the November number of the *Nineteenth Century* for the year 1878, and in another article in the *Contemporary Review* of July last, proposes that every young man shall be compelled to insure against want by the purchase of the minimum of 8s. per week for sickness up to seventy years of age, and 4s. per week pension for life after seventy, the title to payment being, not destitution, but sickness, or having attained the age of seventy; and Mr. Blackley estimates that if everybody insured, as a third would not claim, the payment of 10*l*. would be sufficient to provide the necessary funds for payment of the claims of 8s. per week during sickness up to seventy, and 4s. per week for life after seventy; and he proposes that beyond this minimum the purchase price shall be 15*l*. for every 8s. per week during sickness up to seventy, and 4s. per week for life after seventy. . . . . Waiving for a time the discussion of the subject of compulsion, why should not a national association be organised embodying these several modes of assurance? At any rate, surely the matter is worth attention and a crucial investigation. To start with, an inadequate scale of payment would be most undesirable; for, unless self-supporting, the plan would not be satisfactory or command respect. At the same time, it must have a national guarantee, the same as the Post-office Savings Bank, and while no expense to the State, it would give the arrangement an undoubted security, making it as safe as the English funds. The industrial classes are generally manifesting a desire to make some provision for the future. The large number yearly joining friendly societies; the 1,400,000*l*. paid last year to one London office for life assurances, of small amounts per policy; and the 30,000,000*l*. on deposit at the Post-office Savings Bank, on the 31st of December, 1878, of which 3,360,636*l*. were deposited during the year 1878, in amounts averaging 2*l*. 16*s*. 5*d*. to each depositor,—these evidence both their anxiety and their efforts to secure their future, and we rejoice to know that this amount of 30,000,000*l*. is in safe keeping. Why should not the millions now paid yearly to tottering friendly societies be paid into keeping equally secure with the Post-office Savings Bank, to the advantage of those who struggle to pay, and whose future is dependent on the produce of their payments?"

Miscellanea.

A Gothic Shrine—The Geneva correspondent of the *Times* writes:—"The Historical-Antiquarian Society of Grisons have lately added to the treasures of their museum one of the few Gothic altar shrines that still remain in Eastern Switzerland. It was formerly in a chapel belonging to the Mesolcina family, and has been purchased by the society from the present proprietor of the château, of which the chapel forms a part. The shrine is divided into three parts. On the plinth is a painting in oil of the handkerchief of St. Veronica held by two angels, and on the triptych and side shrines are portraits, also in oil, of St. Stephen and St. Anthony. The inside of the shrine is gilt, and the gilding is in excellent preservation. The interior contains figures carved in wood of St. Nicholas, St. Maria, and St. Catherine, their names being indicated in the later Gothic characters. Two other figures are carved on the reverse part of the side shrines, but the names of the saints whom they are intended to represent are not given. On the crown of the shrine are carved seven busts, supposed to be those of the founders or patrons of the chapel. The barets of two of the number mark them out as priors of St. Victor; two others wear clerical costumes, the remaining four being habited as civilians. With the exception of some slight damage to a few of the figures, which can easily be made good, the shrine is exceedingly well preserved. The carvings and paintings are well executed, and belong to the same style of art, and probably to the same age, as the decorations of the cathedral altar of Coire and the altar of the Church of St. Lucius at Churwalden."

The Telephone.—It is well known that if a long dry tube, open at both ends, be held over a jet of burning hydrogen, a musical sound is produced, the pitch and quality of which vary with the length, thickness, and diameter of the tube. It has been proposed to adapt such a tube to the safety-lamp underground, and to place it near a telephone in communication with another telephone in the manager's office on the surface. The alteration of the sound, due to a greater or less admixture of gas with the air of the mine, would warn the manager of the state of the atmosphere in the workings.——During the Sunday School Centenary service at Swansea, the strains of the chorus in the music-hall were distinctly heard at the end of a telephonic circuit of nearly a mile in length. The apparatus was fixed by Mr. J. Legg, who is about to connect the Velindre Waterworks with the Town-hall, a line nine miles in length. We hear that the same gentleman has just received an order from Madame Adelina Patti to put up a line between her castle (Craig-y-nos) and Penwyllit Railway Station, so that orders for carriages to meet guests may be given. The telephone used is the Gower Bell, which gives great satisfaction.—*The Electrician.*

Proposed Cathedral, Douglas, Isle of Man.—A statement is made that it is in contemplation by certain persons shortly to present land in Douglas as a site for a cathedral for the Isle of Man.

Samaritan Free Hospital.—Messrs. H. Saxon Snell & Son have been requested to prepare a design for the new Royal Samaritan Free Hospital on the site of Dorset House, St. Marylebone.

A Gallery of Casts.—The *American Architect* says,—"An offer has been made to the Metropolitan Museum of Art, which its friends cannot be too prompt in enabling it to accept. It is proposed to furnish the Museum, not only with a complete set of casts from all the principal collections of sculpture in the world, but with moulds for casting duplicates, provided sufficient money shall be contributed to pay for the work and material. A little reflection is necessary to enable non-professional persons to comprehend the value of this offer, and the importance of seizing at once an opportunity which can never occur again in so favourable a form. It is well known that the marble antiques which fill the galleries of Europe are steadily deteriorating under the combined influence of the acid vapours which load the atmosphere of modern cities, and the dusting which is necessary to keep them clean, so that within a year or two the authorities of the British Museum have been compelled to shut up some of their bas-reliefs in glass cases, and to varnish others with silicates in order to prevent their total ruin. As it is, the casts now made are inferior to the ones taken twenty years ago, and those of twenty years hence will be still worse, so that not a moment should be lost in securing a collection of moulds before the exquisite texture and surface of the original has been further attacked. The completeness of the collection which is now within our reach gives it also immense value. It must not be forgotten that works of sculpture are not only examples of art, but historical documents, and that an incomplete collection of casts, however well selected from the artistic point of view, is as useless to history, compared with a more comprehensive one, as would be a selection of manuscripts of the Augustan age alone, compared with the riches of the Vatican Library."

At the Astley Bridge Local Board Offices, on Tuesday, the 14th of July, Mr. J. T. Harrison, C.E., on behalf of the Local Government Board, held an inquiry as to the application of the Astley Bridge Local Board for permission to borrow the sum of 3,076*l*. After the explanations of the chairman of the Streets Committee (Mr. Leach), the surveyor (Mr. Lomax, and the clerk (Mr. Marsden) as to the purposes for which the sum was required, the inquiry closed. There was no opposition. At the conclusion of the proceedings, Mr. Harrison made several inquiries into the working and construction of the sewage works, and made the following statement:—Some time ago, without the knowledge of the Astley Bridge Authority, he made an inspection of their sewage works, examining the inlets and the outlets for the sewage, and the construction and working of the tanks and filter for the purpose of satisfying himself upon the efficiency of their working, which he approved, the principle of the works being good. Still further to satisfy himself that the results were such as to warrant his recommendation of the principle on which they were constructed, he took six samples of the effluent water before it passed into the river, and sent them to Dr. Frankland, the analytical chemist of the Local Government Board, for analysis. Dr. Frankland's report to the Board was highly satisfactory; for he stated that, although there was a quantity of organic matter in the water, it was of such a quality that it might be turned into any watercourse, and that it came within the standard of purity required.

The Water Supply of the Metropolis.—The Select Committee appointed to consider the question of the water supply of the metropolis have agreed upon their report. It is understood that it recommends the creation of a Water Trust, to be elected from the Corporation of the City of London, the Metropolitan Board of Works, and the other bodies representing water districts outside the jurisdiction of these corporations. The Committee arrive at the conclusion that "the agreements" with the water companies accepted as a basis of Sir Richard Cross's scheme for the purchase of the existing waterworks should be placed out of court. They do not oppose the purchase of the waterworks upon reasonable terms, but suggest that favourable consideration should be given to the possibility of obtaining a supply from other sources.—*Morning Post.*

Mr. Stephen Tucker, Rouge Croix Pursuivant of Arms, has been nominated by the Duke of Norfolk, Hereditary Earl Marshal, to the Patent Office of Somerset Herald in Ordinary, held in recent years by the late Mr. Planché.

Balsall-heath Local Board.—A special meeting of this Board was held on July 27, Mr. Parsons presiding. The chairman, in explaining the object of the meeting, said they had been called together to sanction an application to the Local Government Board for the borrowing of 22,000*l*. for sewerage works. The Board, who had already applied for a loan of 15,000*l*., were now in a peculiar position, inasmuch as the sewerage works committee knew nothing whatever about the matter. He was astonished at the amount now asked for in connexion with the sewerage works. A few months ago Mr. Nicholls, the engineer to the Board, said an expenditure of 23,000*l*. would meet the case, whereas according to him at the present time the cost would be 37,000*l*. The Board were astonished, when the work was about three parts finished, to find they required a sum of 13,000*l*. as extras for the completion of No. 2 contract, which amounted to 16,000*l*. The following resolution was carried:—"The Board strongly complains of the conduct of Mr. Nicholls, the engineer, in not letting the Board have his estimates of the amount required to complete the sewerage scheme earlier than twenty minutes before the Government inspector held his late inquiry, which left the committee in such a position that they could not examine their correctness before they were laid before the inspector; and the Board requires immediate details as to how Mr. Nicholls makes out his estimate of 13,041*l*. upon Mr. Palmer's contract of 15,456*l*., as the Board was led to believe that Mr. Nicholls undertook to carry out the scheme prepared by Mr. Barnes; that he then only estimated the extras at 686*l*., subject to the usual contingencies of treacherous ground; and the Board cannot understand why the extras should exceed that sum except for reasonable sums for converting old sewers for storm-water use and hazardous ground."

The Armstrong Park, Newcastle-on-Tyne, has been opened. Mr. W. H. Newton, Chairman of the Parks Committee, in the course of the proceedings stated that some two years ago the Corporation purchased two properties for the purposes of public parks: the first was at Elswick and the other at Heaton. They had scarcely handed over the Heaton purchase to the committee to be laid out when their distinguished townsman, Sir Wm. Armstrong, signified his approval of the action on the part of the Corporation by supplementing the 22½ acres at Heaton by 28½ acres, making a total of 50 acres at Heaton for park purposes. Some 6,000*l*. have been expended in laying out the park (under the direction of Mr. Fowler, the borough engineer). The Corporation had recognised a wise obligation in promoting district parks and recreation-grounds, and had testified their gratitude to Sir Wm. Armstrong in what he trusted would be a most agreeable form, for this property would be known hereafter by the name of the Armstrong Park. It was a pleasing reflection that, while the name of Sir Wm. Armstrong would be handed down as the greatest artillery and hydraulic engineer of his age, the people of Tyneside would associate his name and his memory with one of the greatest public boons which it was possible for a community to enjoy.

Compensation.—Under-Sheriff Burchell presided last week at the Sheriffs' Court, Red Lion-square, over a special jury, in the compensation case of "Jones *v.* The Midland Railway Company," in which a claim was made of between 5,000*l*. and 6,000*l*. for four very old freehold wooden houses in Royal Mint-street, Tower-hill, required by the railway company. Evidence was given by the claimant, Robert Jones, who was a coal-dealer in one of the houses, where he had carried on business for eighteen years; the other houses he let in weekly tenements. He bought at the present time the best coals delivered to him at 18*s*. per ton, and by selling them in small quantities he made 12*s*. per ton profit; he made 7*s*. a chaldron on coke, 2*s*. 3*d*. per sack on charcoal, and a good profit on firewood. His net profits exceeded 300*l*. a year, besides the profit on the houses; and as he could get no premises near Mint-street, 900*l*., being three years' purchase, was asked for the business. The freehold for building purposes in the neighbourhood had nearly doubled in value. Surveyors estimated the value at from 4,525*l*. to 4,800*l*. After the case had occupied about five hours (the jury having made a personal inspection of the premises), a verdict by consent was taken for 4,000*l*.

Sewage in the Thames.—At the last meeting of the Woolwich District Board of Works, Mr. Tuffield referred to the nuisance caused by the discharge of the sewage of the metropolis into the Thames. No one, he said, could go to London by boat with any degree of comfort. At high water the river was black, and emitted an abominable stench, whilst sewage matter could be seen floating on the top. The men on the pier said that the nuisance arose from the men at the outfall sewers discharging the sewage into the river before the high tide. The consequence was that the discharged sewage floated up to Woolwich and Greenwich. If the London sewage could not be utilised profitably, it ought to be utilised unprofitably. It had become a nuisance never contemplated by Act of Parliament. Woolwich parish had a good system of drainage before the Metropolitan Board of Works forced the existing scheme upon them. They were charged vast sums of money for being afflicted with an intolerable nuisance. Government could never have contemplated the Thames at Woolwich being converted into an open sewer, or they would certainly have put a veto on the present system of drainage for the sake of the health of the troops. The chairman said that he fully endorsed the statements of Mr. Tuffield. He never knew the river to be in such a state as at the present time. The Thames was infinitely worse now than before the construction of the northern and southern outfalls. It was resolved to write to the Metropolitan Board, asking for immediate attention to be given to the present filthy condition of the river. Capt. Behenna said that notices were put up at the outfalls that the sluices should be opened at a certain time after ebb. Instead of these orders being obeyed, the sluices were opened when the flow was going on, and before the flood had attained its height.

Iron and Steel Institute.—The detailed programme of the annual meeting of this Institute, to be held at Düsseldorf, on August 25, 26, 27, and 28, is now published. On the 25th there is to be in the morning a general meeting of members at the Tonhalle, where the Institute will be received by the local authorities; in the afternoon a visit to the exhibition, and to works near Düsseldorf; and in the evening the annual dinner of the Institute at the Tonhalle. On the 26th and 27th there are to be general meetings in the mornings for the reading and discussion of papers; the afternoons are to be devoted to excursions by special trains to various iron and steel works in the neighbourhood of Düsseldorf, followed by concerts in the evenings. The whole will be brought to a close by a Rhine excursion on the 28th, to Cologne, *viâ* Rolandseck, Bingen, and Coblentz.

TENDERS

For the erection of a parsonage-house, in the parish of Holy Trinity, Esclusham, Wrexham, for the Rev. L. W. Davies. Mr. J. E. Lash, architect. Quantities by Mr. W. Lunn:—

B. Owen, Wrexham	£2,356	0	0
Bleakley, Birkenhead	2,332	0	0
Samuel, Wrexham	2,050	0	0
Rogers, Rossett	2,031	0	0
Hughes & Owen, Wrexham	1,967	10	0
Davies Bros., Wrexham	1,869	3	8
Phennah & Davies, Rhostyllen	1,769	6	0

For the erection of new boys' school in Clyde-street, Edward-street, Deptford, for the School Board for London. Mr. E. R. Robson, architect. Quantities supplied by Mr. T. Thornton Green:—

Harris & Wardrop	£4,497	0	0
Hart	4,437	0	0
Atherton & Latta	4,417	0	0
Hunt	4,340	0	0
Cox	4,269	0	0
Kirk & Randall	4,209	0	0
Tongue	4,193	0	0
Jerrard	4,074	0	0

For the enlargement of schools at Olga-street, Grove-road, Hackney, for the School Board for London. Mr E. R. Robson, architect. Quantities supplied by Mr. T Thornton Green:—

Brass	£3,904	0	0
Higgs & Hill	3,940	0	0
Shephard	3,910	0	0
Kirk & Randall	3,865	0	0
Sargeant	3,844	0	0
Boyce	3,770	0	0
Wood	3,745	0	0
Williams	3,542	0	0
Stimpson	3,320	0	0
Grover	3,284	0	0

For new offices, 57, Moorgate-street, and ground floor and basement, 76, Coleman-street, for Messrs. W. & J. R. Hunter. Mr. Henry Dawson, architect. Quantities by Mr. C. N. McIntyre North:—

Roberts	£5,825	0	0
Bangs & Co.	5,730	0	0
Kirk & Randall	5,510	0	0
Ashby Bros.	5,489	0	0
Ashby & Horner	5,444	0	0
Colls & Sons	5,250	0	0
Woodward	5,098	0	0

For new residences, New Warwick-road, Milverton, for Messrs. H. C. Passman and Geo. Rogers. Messrs. Brown & Albury, architects:—

Mills (accepted).

For new show-room, Broad-street, Reading, for Messrs. Wellstead & Co. Messrs. Brown & Albury, architects:—

Higgs	£913	0	0
Woodroffe	830	10	0
Searle	800	0	0
White	785	0	0
Denton	689	10	0
East	660	0	0

For bronze shop-front and revolving shutters for the above:—

Bunnett & Co. (accepted)	£148	10	0

For new entrance-lodge and alterations to residence of Capt. Beaumont, Calcot-place, Reading. Messrs. Brown & Albury, architects:—

Simonds	£539	0	0
Denton	507	0	0
Wornham	499	16	0
Wigmore (accepted)	451	0	0

For industrial dwellings in The Forbury, Reading, for Mr. Robert Tompkins. Messrs. Brown & Albury, architects:—

Carter	£2,303	0	0
Searle	2,244	0	0
Weaver	2,240	0	0
Simonds	2,197	0	0
Kingerlee	2,145	0	0
Lewis	2,110	0	0
Denton	2,077	0	0
Wornham (accepted)	1,895	0	0
Fireproof Flooring.			
Dennett & Co.	£200	0	0

For cleaning and renovating internally and externally St. Stephen's Church, North Bow:—

Robey, Bow-road	£210	0	0
Barrow, Malmesbury-road, Bow	189	0	0

For the erection of Sunday schools, class-rooms, caretaker's house, &c., in the rear of Walworth Wesleyan Chapel, Camberwell-road, for the Building Committee. Mr. Charles Bell, architect:—

Kirk	£2,934	0	0
Hall, Beddall, & Co.	2,894	0	0
Woodward	2,854	0	0
Smith	2,749	0	0
Downs	2,734	0	0
Hickinbotham	2,698	0	0
White	2,690	0	0
Hobson	2,615	0	0
Tarrant & Son	2,489	0	0
Goad (accepted)	2,485	0	0
W. & H. Castle	2,456	0	0

For alterations and additions to 15, Upper Wimpole-street, Marylebone, for Mr. Horace J. Semple. Mr. Maurice H. Pocock, architect:—

Sharp & Evered	£850	0	0!
Griggs	823	0	0
Strong Bros.	760	0	0
McCormack	725	0	0
Higgs	673	10	0
Holloway	672	0	0
Goad (accepted)	563	0	0
Robertson	421	0	0!

For the erection of four houses, Ruabon-road, Wrexham, for Mr. Thos. Griffiths. Mr. J. E. Lash, architect:

Cunnah & Co., Marford	£1,480	10	8
Samuel, Wrexham	1,468	0	0
Rogers, Rossett	1,218	0	0
Price & Evans, Wrexham	1,165	0	0
Thos. Jones, Wrexham	1,164	0	0
Owen, Wrexham	1,120	0	0
Roberts & Gittins, Rhos	1,120	0	0
S. Jones, Coedfroeth	1,110	10	0
Phennah & Davies, Rhostyllen	1,090	10	0
Davies Bros., Wrexham	1,089	0	0
Oliver, Wrexham	1,075	0	0

For new vicarage at Ruislip, Herts. Mr. A. T. Nutt, architect. Quantities by Messrs. Arding, Bond, & Buzzard:—

Carless	£3,420	0	0
McLachlan & Sons	3,045	0	0
Elder	3,010	0	0
Kearley	2,893	0	0
Kendal	2,809	0	0
Fassnidge	2,793	0	0

For additional pianoforte factory, Grafton-road, Kentish Town, for Messrs. John Brinsmead & Sons. Messrs. Spalding & Evans, architects. Quantities by Mr. Geo. Fleetwood:—

Brass	£2,864	0	0
Roberts	2,823	0	0
Manley	2,790	0	0
Perkins	2,777	0	0
Dove Bros.	2,755	0	0
Outhwaite	2,625	0	0

For erecting additional stories to buildings, 258, Euston road (exclusive of ironwork), for Messrs. Weiles & Co. Messrs. Ernest George & Peto, architects. Quantities by Messrs. Stoner & Sons:—

Longmire & Burge	£1,130	0	0
Simpson & Son	1,099	0	0
Manley	1,079	0	0
Burford	1,075	0	0
Perkins (accepted)	1,067	0	0

For pulling down and rebuilding a wing to the Vicarage, Rudgwick, Sussex. Mr. Owen Lewis, architect:—

Beale, Battersea	£635	0	0
Peters & Co., Horsham	537	0	0
Port, Ewhurst (accepted)	510	0	0

TO CORRESPONDENTS.

Stoke Newington (writer should have sent his name).—Clericus (when a person writes a libel he should, at any rate, have "the courage of his opinion" and sign it).—T. T., Wellington (a view shall appear).—E. G (builder not yet appointed. We do not give addresses).—H. D. (tenders were not enclosed).—A. J. (next week).—O. G. (next week).—P. C. (under consideration).—S. B.—J. H.—R.—T. W. W.—H. H.—H. C. R.—R. V.—A. J. B.—J. B. L.—G. P.—W. C. B.—T. C. S.—O. M. W. S.—A. M.—E. C. S.—B. & Son.—Mr. P.—B. & A.—G. & P.—C. J. B.—W. S.—J. B.—D. W.—O. L.—J. W. S.—F. P.—P.—G. & H.—J. E. C.—C. G.—A. C. R.—J. W.—Mr. C.—J. F. & Co.—F. E. T.—M., V., & M.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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